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AN ANALYSIS OF THE IMPACT OF THE SCHOOL PROPERTY TAX
AND THE DISPARITIES IN PUBLIC SCHOOL
FINANCE IN SOUTH DAKOTA

BY

RONALD R. SODERBERG

A thesis submitted
in partial fulfillment of the requirements for the
degree Master of Science, Major in
Economics, South Dakota
State University

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ACKNOWLEDGMENTS

AN ANALYSIS OF THE IMPACT OF THE SCHOOL PROPERTY TAX

AND THE DISPARITIES IN PUBLIC SCHOOL FINANCE IN SOUTH DAKOTA

It is difficult to express to all of those persons who have assisted in this research endeavor. With this in mind, however, the author would like to take this space to personally thank some of those people who are far more than deserving of his appreciation.

To begin, the author wishes to express his deepest appreciation to William Kaepe for his personal encouragement and expert professional guidance throughout the course of this study and the preparation of this manuscript. Special thanks is also extended to Dr. Felix Hain for his

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department of Elementary and Secondary Education whose cooperation and assistance in this study was immeasurable. Finally, thanks is extended to my typist, Eileen Verley, for her efficient work in the typing of this manuscript.

Thesis Adviser Date

Head, Economics Department Date

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It is difficult to render the proper recognition to all of those persons who have assisted in the preparation of this research endeavor. With this in mind, however, the author would like to take this space to personally thank some of those people who are far more than deserving of his appreciation.

To begin, the author wishes to express his deepest appreciation to William Kamps for his personal encouragement and expert professional guidance throughout the course of this study and the preparation of this manuscript. Special thanks is also extended to Dr. Felix Hsia for his help in the analytical phases of this investigation.

Also, the author would like to thank Mr. Gale Schlueter and his staff within the Statistical Services Division of the South Dakota Department of Elementary and Secondary Education whose cooperation and assistance in this study was immeasurable. Finally, thanks is extended to my typist, Eileen Verley, for her efficient work in the typing of this manuscript.

RRS

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CHAPTER I

INTRODUCTION

The importance of education both for the well-being of the nation and its people, has long been recognized within the American society.

Speaking on the subject, A. K. Campbell notes:

Throughout its history this nation has stressed education as the primary means of guaranteeing every citizen an equal chance at obtaining the rewards of an open society. If educational opportunities are unequal, then the American experiment in equality of opportunity must fail. The evidence indicates that we are indeed failing. Nor is there any strong indication that we are about to correct this failure.¹

Indeed, the founders of the state of South Dakota felt education to be of such importance that they explicitly included within the State's Constitution a section regarding the establishment of an educational system. Section 1 of Article VIII reads:

The stability of a republican form of government depending on the morality and intelligence of the people, it shall be the duty of the legislature to establish and maintain a general and uniform system of public schools wherein tuition shall be without charge, and equally open to all; and to adopt all suitable means to secure to the people the advantages and opportunities of education.²

Of particular note is the implied requirement that the educational system must be of a nature that all people are given an "equal" educational

¹Alan K. Campbell, "Inequities in School Finance," Saturday Review, Vol. LII (January 11, 1969), p. 14.

²Office of the Secretary of State, Constitution of the State of South Dakota Article VIII, Section 1 (Pierre: State Publishing Co., 1970), p. 17.

opportunity. Interpreted broadly, this means that every individual should be able to receive an education of such quality that it is suited to his needs and aspirations without regard to his social and economic status.

In recent years there has been mounting substantial and often times severe criticism of existing educational systems. Frequently the charge has been that there exist considerable inequalities in the educational opportunities offered by the different schools within these states and hence to the students of these different schools. Coupled with this charge is the general consensus that the situation exists largely because of the states' present systems of school financing ties educational spending to local wealth via the heavy reliance on the local property tax.

Indeed, it was this line of reasoning that led the California Supreme Court in 1971 to invalidate that state's existing system of public school finance in Serrano v. Priest. The court stated:

We have determined that. . .the California public school financing system, with its substantial dependence on local property taxes and resultant wide disparities in school revenue,. . .invidiously discriminates against the poor because it makes the quality of a child's education a function of the wealth of his parents and neighbors. . . . We have concluded, therefore, that such a system cannot withstand constitutional challenge and must fall before the equal protection clause.³

Although this decision was subsequently reversed by the U. S. Supreme

³Serrano v. Priest, 5 Cal. 3d. 584, 1971, cited in Stephen F. Leroy and Peggy Brockschmidt, "The Property Tax and School Finance," the Monthly Review, Kansas City: Federal Reserve Bank, (December, 1972), p. 3.

Court,⁴ the impact it has had on the field of public school finance hasn't been altered. Today, perhaps more than ever before, people are beginning to question their state's existing system of public school finance and the calls for reform in these systems have increased.⁵

The public education system in South Dakota has not been spared from this overall questioning trend in school finance. Citizens' groups, school finance specialists, and the people who are best qualified to speak from their own experience--the educators themselves--have reported that the "advantages and opportunities of education" are neither equally available to all nor sufficiently available to many of the students attending South Dakota public schools.⁶ A recent commission charged with investigating public school finances in the state concluded that much of the current inequalities stem from the heavy reliance on the property tax to finance education. The commission notes in this regard:

Since public education in South Dakota is overwhelmingly dependent on the gross inequalities of local tax-paying ability, it is hardly surprising that gross inequalities of educational opportunity prevail throughout the state. The kind of education

⁴San Antonio Independent School District v. Rodriguez, 93 S. Ct. 1278, 411 U. S. 1, 36, L. Ed. 2nd. 16, 1973.

⁵See for example Robert D. Reischauer and Robert Hartman, Reforming School Finance (Washington: Brookings Institute, 1973), pp. 58-59.

⁶Commission of Professional Rights and Responsibilities, South Dakota: A Statewide Study of Public School Finance and Conditions in the Schools (Washington: National Education Association, 1968), p. 15.

available to a student attending a South Dakota public school is determined far less by his educational needs and aspirations than by where he lives - whether his community is rich, medium, or poor in property tax resources.⁷

A brief look into recent public school finance trends in South Dakota substantiates these conclusions. One point of evidence is that school financing in the state has been highly dependent on local support. Although in recent years the dependence decreased slightly, it still remains considerably higher than the national average. As recently as the 1971-72 school year, for example, 69.7 percent of the revenue for the state's public-supported schools came from local sources while the national average for that year was only 51.0 percent.⁸ In view of the fact that approximately 95 percent of the local tax sources were in turn raised through the property tax for the same year, the obvious conclusion is that the revenue of local schools in South Dakota is closely tied to a school district's tax paying ability, i.e. wealth.⁹

The significance of this dependence can be seen in the different levels of current expenditure per student for the 185 Independent School

⁷Ibid., p. 32

⁸U. S. Department of Health, Education and Welfare, Digest of Educational Statistics (Washington: U. S. Government Printing Office, 1971), p. 52.

⁹Calvin A. Kent and Allyn O. Lockner, Property Taxes and the Circuit Breaker (Vermillion: University of South Dakota, Institute of Public Affairs, 1971), p. 2.

Districts in South Dakota.¹⁰ In the 1971-72 school year Sully Superimposed, for example, spent \$2,408.55 per student, the highest in the state, while Eagle Butte spent only \$535.20. The major reason for the wide discrepancy between these two school districts is the wide disparity in the school districts' property values. Sully has an assessed property valuation of \$265,402 per student while Eagle Butte had only \$9,501. Sully Superimposed was, thus, in a much more favorable position for raising revenue for their schools than Eagle Butte. Even within a county there exist considerable differences in the amount of current expenditure per student various school districts can finance. In Brookings county, for example, although there is only a six pupil difference in the total enrollment between Elkton and Deubrook Independent School Districts, Deubrook spends approximately \$100 more than Elkton on a per-student basis.¹¹

NEED FOR THE STUDY

In view of the wide disparities in school financing in South Dakota, the need for change in the present system is becoming increasingly apparent. Given that most school systems rely heavily on the local property tax for their revenue, the common element of most proposed changes

¹⁰Current expenditures include all operating costs directly related to education. They exclude capital outlays and debt service costs. In this study this measure will be used as the basic measure of financial support for the provision of educational services.

¹¹South Dakota Department of Public Instruction, 1971-72 Educational Statistics Digest (Pierre: State Printing Office, 1972), pp. 13-19.

is to lessen such reliance.¹² To do so, it is believed will eliminate the close ties between a school district's wealth and the quality of education it is able to finance.

Such reform would likely make for a more equitable educational system in South Dakota. For indeed there exist considerable variations in school district wealth within the state. However, it may be that other factors are also important in explaining differences in current expenditures per student between school districts within the state. Possibilities would include differences in the school tax levies and/or differences in the amounts of state and federal aid received.

Consider, for example, a situation where two school districts have comparable assessed property valuations but one's tax levy is far above the other's. Assuming that in all other respects the two are equal, the former district would be able to finance a much higher expenditure per student than the latter. Indeed, the same would be true if one of the districts received more in state and federal aid than the other.

Hence there is a necessity for more information about the extent and nature of the existing inequalities in educational opportunities between school districts in the state. Such information would be useful in evaluating the effectiveness of changes proposed to alleviate problems in the state's present system of school finance.

Subsequent to the need for a school finance study, there is also

In order to facilitate a logical manner for achieving the specified objectives, this thesis is divided into six chapters. Chapter II

¹²See Commission on Professional Rights and Responsibilities, op. cit.

a need to study the impact of the school property tax in South Dakota. This is especially so in light of the recent controversies within the state legislature over proposed tax reform which would lessen local governments' dependence on the property tax. The information needed is whether the impact of the school property tax is progressive, proportional or regressive. That is, does the percentage paid in taxes rise, remain constant, or fall, respectively, as income increases. Again, such information would be very useful in ascertaining the need for tax reform and in evaluating the desirability of alternative reforms.

SKETCH OF THE STUDY

Stemming from the above discussion, the objectives of the investigation are:

1. To examine the impact of that portion of the property tax used to finance elementary and secondary public school expenditures in South Dakota.
2. To obtain information concerning the nature and probable cause of the financial disparities among South Dakota independent school districts induced by their general reliance on the property tax.
3. To investigate the policy implications flowing from the above findings.

In order to facilitate a logical manner for achieving the specified objectives, this thesis is divided into six chapters. Chapter II

presents a general review of literature pertinent to the present study. This is followed by a general discussion of recent trends in South Dakota school finance in Chapter III. In Chapter IV the impact of the school property tax is estimated using log linear regression. Chapter V presents the results of a multiple linear regression analysis employed to determine factors important in explaining the financial disparities among the school districts in the state. Finally Chapter VI summarizes the findings of the above analyses, examines the resulting policy implications and makes some suggestions for reform and further research.

Finance study completed by Stephen F. Laro and Peggy Brookings in 1972. The Laro-Brookings study was conducted within the Kansas City Standard Metropolitan Statistical Area (SMSA) and as a liaison study of the perspectives for the present study.

REVIEW OF THE SCHOOL PROPERTY TAX

The property tax has had a curious history in American public finance. "During the past century, no major fiscal institution, here or abroad has been criticized so much and with such vigor, yet no major fiscal institution has changed so little in modern times. The key to this seeming paradox lies in the importance of the property tax in financing governmental functions, particularly at the local level. In recent years, for instance, the property tax has accounted for

¹ Dick Sorenson, Reform of the Property Tax, (Washington: Brookings Institution, 1966), p. 2.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to review some of the literature relevant to the present study and is divided into three parts. First, a review of the property tax is presented with particular emphasis on the literature concerning the impact of the tax. The second part of the chapter presents a general review of the recent trends in school finance. The last part consists of a review of a property tax and school finance study completed by Stephen F. Leroy and Peggy Brockschmidt in 1972. The Leroy-Brockschmidt study was conducted within the Kansas City Standard Metropolitan Statistical Area (SMSA) and establishes many of the perspectives for the present study.

REVIEW OF THE GENERAL PROPERTY TAX

The property tax has had a curious history in American public finance. "During the past century, no major fiscal institution, here or abroad has been criticized at such length and with such vigor; yet no major fiscal institution has changed so little in modern times."¹³ The key to this seeming paradox lies in the importance of the property tax in financing governmental functions, particularly at the local level. In recent years, for instance, the property tax has accounted for

¹³ Dick Netzer, Economics of the Property Tax (Washington: Brookings Institution, 1966), p. 1.

approximately nine-tenths of the locally raised tax revenue in the United States. This represents, in turn, nearly one-half of the local revenue from all sources. In South Dakota the tie between the property tax and local revenue is even more pronounced. Ninety-five percent of all local tax revenue is derived from levies on property, representing 80 percent of all local revenue.¹⁴

Despite the importance for local government finance, however, the property tax has been severely criticized by economists. As long ago as 1895, Edwin Seligman spoke of the property tax as being ". . . beyond all doubt one of the worst taxes known in the civilized world."¹⁵ Today, the attitude of economists has changed little. Roe Johns and Edgar Morphet write in The Economics and Financing of Education: "The property tax finds less justification in many commonly accepted principles and theories of taxation than any other important tax."¹⁶ Criticism of the property tax has not been limited to economists, however. A recent nationwide poll conducted for the Advisory Commission on Intergovernmental Relations, for example, found that the taxpayers themselves listed the property tax as the "worst" and "the least fair" of all the major taxes

¹⁴Kent and Lockner, op. cit., p. 2.

¹⁵Edwin R. A. Seligman, Essay in Taxation (9th ed.; New York: Macmillan Company, 1923), p. 62.

¹⁶Roe L. Johns and Edgar L. Morphet, The Economics and Financing of Education (2nd ed.; Englewood Cliffs, NJ: Prentice-Hall, Inc., 1969), p. 202.

presently used in the United States.¹⁷

Essentially six major charges have been the basis for much of the criticism.¹⁸ Specifically:

1. The amount of real property owned by a person bears little relation to his ability to pay taxes.
2. Property ownership bears scant relation to the receipt of services paid for out of property taxes.
3. The property tax is difficult or prohibitively expensive to administer equitably.
4. The geographic location of the tax base usually does not correspond with the location of the need for property tax-financed services.
5. The property tax often discourages residential ownership and construction.
6. The property tax is regressive in its impact; i.e., the poor pay a higher proportion of their income in property taxes than the rich.

Of these charges, the latter, the assertion that the property tax is regressive, is considered to many to be the most serious since it is believed the tax imposes an excessively heavy burden on low-income groups.

Critics of the property tax also point to the burden it imposes on the elderly and retired who frequently live in their own homes but on very limited incomes. As Calvin Kent stated with regard to the South Dakota property tax:

¹⁷Advisory Commission on Intergovernmental Relations, Financing School and Property Tax Relief - A State Responsibility (Washington: ACIR, 1973), p. 26.

¹⁸These six charges are enumerated in Stephen F. Leroy and Peggy Broockschildt, "Who Pays the School Property Tax?" Monthly Review (Kansas City: Federal Reserve Bank, November 1972), p. 1.

Perhaps the most discouraging aspect of the property tax is its effect on those with low incomes. For many, particularly the elderly, their earning years have been disrupted or have ended. For them property taxes on their homes take a very large amount of a meager income.¹⁹

THE IMPACT OF THE PROPERTY TAX

Before proceeding into a discussion of previous studies on the burden of the property tax, it is useful to examine the impact of the tax more closely.²⁰ What is needed is to differentiate between the terms progressive, proportional and regressive. Since education is financed through school districts, it is useful to view the discussion in this context.

In most discussions on the impact of the property tax the measurement of ability to pay is income. Income, in turn, is related to an individual's property tax payment to assess the impact of the tax. Thus, the simplest means for measuring the impact of the property tax is to determine whether the proportion of income paid in property taxes rises (is progressive), falls (is regressive), or remains constant (is proportional) as income rises.

With adequate data on individuals' income and tax payments, the foregoing method is simple. Studies utilizing an indirect method of measuring the property tax impact, however, are becoming more frequent.

¹⁹Kent and Lockner, loc. cit.

²⁰This discussion draws heavily from work done by Leroy and Brockschmidt, op. cit., pp. 5-6.

Essentially the method involves expressing property taxes as the product of several variables and then relating these variables in turn to income. Theoretically, the resulting estimates yielded by both methods will be approximately the same. The indirect method has the further advantage, however, of yielding information about the determinants of the property tax. Hence it is possible to learn not only if the school property tax impact is progressive, proportional, or regressive, but also why. It would remain to identify the variables that explain such impact. To allow implementation of the approach, Leroy and Brockschmidt make the following observation:

To isolate the variables that determine the incidence of property taxes, it is sufficient to ask under what circumstances a wealthy man would pay a higher proportion of his income in property taxes than a poor man. This would occur (1) if the assessed value of the wealthy man's home was higher in proportion to his income than the assessed value of the poor man's home, or (2) if the wealthy man lived in a school district with a high tax rate, while the poor man lived in a district with a low rate. In these cases the property tax would be progressive, while in the reverse cases it would be regressive.²¹

Examples may help clarify why the property tax impact depends directly upon the relationship between tax payments and income and indirectly upon the relationship between (1) housing value and income, and (2) the tax rate and income. Beginning with the direct method relating total tax payments and income, suppose that Mr. Brown has an income of \$20,000 and Mr. Black has an income of \$22,000, or 10 percent more than Mr. Brown. The property tax will be proportional in its impact provided that Mr. Black pays 10 percent more in taxes than Mr. Brown, since

²¹Ibid., p. 5.

in this case both men would be paying the same proportion of their incomes in property taxes. If, however, Black were to pay anything less than 10 percent more than Brown, the property tax would be regressive since now Black with his higher income will be paying a smaller proportion of his income in property taxes than Brown. If, on the other hand, Black's tax payments were to exceed Brown's by more than 10 percent the impact of property tax would be progressive for the opposite reason as that above.

With the indirect method it is necessary to relate the percentage differences between Black and Brown's property tax payments to the differences in their tax rates and assessed values of their homes. Leroy and Brockschmidt observed in this regard:

. . .the percentage differences between total property tax payments is approximately equal to the sum of the percentage difference in the assessed value of their homes and the percentage difference in the property tax rates they pay. Thus to calculate the percentage difference in total tax payments it is necessary only to compute the percentage difference in assessed values plus the percentage difference in tax rates. If the resulting figure is greater (less) than the percentage difference in income, the property tax is progressive (regressive).²² (Emphasis supplied.)

As noted in the Leroy and Brockschmidt quote, the indirect method yields an approximate estimation of percentage differences in individuals' total tax payments by summing the percent differences in assessed values and tax rates. It can be shown, however, that this basic methodology can be extended to gain an estimation which will be exactly equal to the percentage differences between the total tax payments of different individuals.

²²Ibid., pp. 5-6.

Basically, this necessitates not only summing the percentage differences in individuals' assessed values and tax rates but also adding to this sum the product of the two percentage differences. Again, as with the Brock-schmidt-Leroy method if the resulting figure is greater (less) than the percentage difference in the individuals' incomes, the impact of school property tax will be progressive (regressive). Specific examples may also help clarify this methodology.

Figure II-1 illustrates three hypothetical calculations allowing easy depiction of the method. In all cases Black's income (\$22,000) exceeds that of Brown by 10 percent. Situation 1 depicts a case in which Black and Brown are assumed to live in the same school district, but the former's home is assessed 10 percent higher (\$11,000) than the latter's (\$10,000). Since the percentage difference in tax payments equals the sum of the percentage difference in tax rates and assessed values, 0 percent plus 10 percent, plus the product of these two percentages--0 percent--the resulting figure, 10 percent, implies that the school property tax is proportional in its impact. This stems from the percentage differences in the individual tax payments being exactly equal to the percentage difference in their incomes.

In Situation 2, Black's home is again assessed at 10 percent more than Brown's but now the two are assumed to live in different school districts with Black paying a \$6.00 property tax rate which is 20 percent higher than the \$5.00 levy paid by Brown. Thus, the school property tax is progressive, since now Black's total tax payment exceeds Brown's by

FIGURE II-1

HYPOTHETICAL SITUATIONS ILLUSTRATING THE INDIRECT METHOD

		BROWN INCOME OF \$20,000	BLACK INCOME OF \$22,000	PERCENTAGE DIFFERENCE	SUM	IMPACT OF TAX
Situation 1	Tax Rate (per \$100 assessed value)	\$5.00	\$5.00	0%	10%	Proportional
	Assessed value of home	\$10,000	\$11,000	10%		
Situation 2	Tax Rate (per \$100 assessed value)	\$5.00	\$6.00	20%	32%	Progressive
	Assessed value of home	\$10,000	\$11,000	10%		
Situation 3	Tax Rate (per \$100 assessed value)	\$5.00	\$5.00	0%	5%	Regressive
	Assessed value of home	\$10,000	\$10,500	5%		

Source: Stephen F. Leroy and Peggy Brockschmidt, "Who Pays the School Property Tax?," Monthly Review (Kansas City: Federal Reserve Bank, November 1972), p. 5.

32 percent (20 percent plus 10 percent plus 2 percent) which is greater than the 10 percent difference in their incomes.

Situation 3 depicts a case where Black and Brown incur the same tax rate, but in this case Black's home is assessed at only 5 percent more than that of Brown. Under these conditions, the school property tax will be regressive, since Black's total tax payment is only 5 percent more (5 plus 0 plus 0) than that paid by Brown which is less than the 10 percent difference in their income.

These examples show that the extension of the Leroy-Brockschmidt indirect method yields the same impact for the school property tax regardless of whether the direct or indirect method is employed. In Situation 2, for example, the estimated difference in tax payments was found to be 32 percent by the indirect method. This percentage difference is exactly equal to the "true" percentage difference in tax payments paid by the two individuals since in this example Black would pay \$660 in taxes which is 32 percent more than the \$500 paid by Brown.

REVIEW OF STUDIES OF THE IMPACT

OF THE PROPERTY TAX

As has been previously mentioned, one of the major criticisms of property tax is that it is regressive: the poor pay a higher proportion of their income in property taxes than the rich. Furthermore, as noted by Dick Netzer in his book Economics of the Property Tax:

Rather good evidence on incidence by income class of property taxes on owner-occupied houses strongly indicates that this component of the tax is even more regressive than the nonresidential component. Somewhat less direct evidence indicates that the tax on rented housing is still more regressive.²³ (Emphasis supplied)

Traditionally, a major explanation for this situation is that housing expenditures exhibit a relatively low income elasticity in the sense that, at any one time, richer families spend less proportionally for housing than poorer families.²⁴ On the basis of this hypothesis studies undertaken to directly correlate individual current money income and property tax payments have almost without exception found the property tax to be regressive.²⁵ One of the frequently cited studies is the one done by Richard Musgrave. Musgrave found that families in the lowest income bracket pay about 30 percent more in relation to their income than families in the highest income bracket.²⁶

More recently, however, studies based on the direct method have come under attack. Basically, the attacks have stemmed from the work done by Milton Friedman.²⁷ Friedman's contention is that the use of current

²³Netzer, op. cit., p. 40.

²⁴Ibid., p. 57.

²⁵Ibid.

²⁶Richard A. Musgrave, "The Incidence of the Tax Structure and Its Effects on Consumption," Federal Tax Policy for Economic Growth and Stability (Washington, Joint Economic Committee, 1955), pp. 97-98.

²⁷Milton Friedman, A Theory of the Consumption Function (Princeton: Princeton University Press, 1957).

money income subjects the results of many types of studies to serious statistical bias.²⁸ Briefly, Friedman's hypothesis is that the value of housing owned by a family depends more upon some measure of the family's long run average income as compared to its current income since most people will not buy or sell housing in response to short-run variations in income.²⁹ Further, Friedman's hypothesis implies that attempts to measure the dependence between housing and current income, rather than "normal" income, will bias the estimate towards zero.³⁰ For this reason, studies employing the direct method are likely to be biased toward regressivity by incorporating current fluctuations in income.

Margaret Reid, in her work Housing and Income was one of the first persons to apply Friedman's analysis to an in depth time series study of housing demands. Her conclusion followed that expected by the Friedman approach: housing demand proved to be more responsive to income when a proxy of normal income replaced current income as the main determinant of the demand for housing. Reid summarized her results as follows:

The Schwabe law of housing, that housing-income ratios tend to be lower for the rich than the poor, and hence to decline with rise in normal income, has long been accepted and many predictions and policies have been formulated with such expectation.

²⁸Ibid, pp. 31-37.

²⁹Leroy and Brockschmidt, op. cit., p. 6.

³⁰Friedman, loc. cit.

The findings of this monograph imply the opposite tendency. They show higher housing-income ratios for the rich than the poor. In other words, the ratio of housing to income tends to rise with normal income. The findings imply an elasticity of housing with respect to normal income around 2.0. Furthermore, it indicates that this relationship was quite stable between 1917 and 1960.³¹

Further, Richard Muth found that the use of cross sectional data rather than individual data averages out the effect of random fluctuations in transitory income, thereby making cross sectional data a good proxy for normal income.³² Since it was random fluctuations in transitory income that led to the statistical bias, the use of cross sectional data apparently removes the main complaint of average income advocates.

In sum, recent studies questioning the widely held view that the wealthy typically spend a smaller fraction of their income on housing than the poor have likewise brought into question the widely held view that the property tax is regressive in its impact. Furthermore, studies undertaken to determine the impact of the property tax employing cross sectional data have found the impact of the tax to be proportional or even slightly progressive. One such study is the Leroy-Brockschmidt study to be discussed in a later section of this chapter. In that study, the impact of the school property tax on residential property was found to be proportional rather than regressive.

³¹Margaret G. Reid, Housing and Income (Chicago: University of Chicago Press, 1962), pp. 387-388.

³²Richard F. Muth, "The Demand for Non-Farm Housing," The Demand for Durable Goods (Chicago: University of Chicago Press, 1960), pp. 29-98.

REVIEW OF SCHOOL FINANCE

The major burden of providing and financing public schools in the United States has been delegated by most states to local governmental units. Hence, traditionally, the problems of school finance have been considered primarily a local concern; the responsibilities of local governments and school administrators. In recent years, however, this situation has seen a major transformation. The problems of school finance have become an issue of national importance and public concern.

At least two forces have been responsible for the great surge of interest in the methods by which schools are financed. Moreover, each has raised fundamental questions about the present system of school finance utilized by most states. The first of these forces has been the increasing doubt as to whether traditional sources of school revenues are capable of supporting the future burden of public education.³³ In the past decade and a half, for instance, total expenditures for public elementary and secondary education in the United States have more than tripled, increasing from \$13.6 billion in 1957-58 to \$46.8 billion in the 1971-72 school year.³⁴ While expanded federal and state aid have helped, school districts have had to rely heavily on local revenues to finance these recent increases in educational expenditures. Traditionally,

³³Reischauer and Hartman, op. cit., p. 1.

³⁴Ibid., p. 18.

³⁷Reischauer, loc. cit.

this has been facilitated by going to the taxpayers and asking for their approval of bond issues, which they did almost 70 percent of the time during the early and middle 60's.³⁵ But, since that time resistance to further increases in local contributions to education has mounted in the form of what the literature on the subject has labeled a taxpayers' revolt. As Francis Keppel has noted:

There can be little doubt that today the local taxpayer feels painfully squeezed. The enthusiasm with which he votes "no" on local bond issues and school budgets whenever he gets a chance is a marked change from the mid-1960's. In those days he voted "yes" three times out of four. Today the school board that goes to the people's well comes back with an empty pail more often than not - and the pail tends to get smaller on each trip.³⁶

Furthermore, authorities see this resistance on the part of the taxpayers not as a rejection of the need for greater school spending, but rather as "a repudiation of the prevailing method of raising school revenue; it is a revolt against the heavy reliance on local school property taxes."³⁷

A second force that has propelled school finance problems into the limelight, has been the widening belief that the present system of school finance discriminates against the poor. This discrimination is believed to be twofold. First, many believe that the use of the property

³⁵Francis Keppel, "The Cost Revenue Squeeze," Financing Public Schools, Federal Reserve Bank of Boston Conference Series, No. 7 (Cambridge, Harvard University Press, 1972), p. 11.

³⁶Ibid., p. 11.

³⁷Reischauer, loc. cit.

tax to finance school expenditures contributes to the tax's regressive impact. John Coons, William Clune, and Stephen Sugarman in Private Wealth and Public Education have characterized this belief as follows:

Since school districts populated by the poor must levy the property tax at higher rates than their wealthier neighbors in order to generate equal amounts of revenue, the present system of school finance discriminates against the poor.³⁸

A study of six New England states conducted by Steven J. Weiss verifies this conclusion. On the basis of his calculations Weiss concludes:

Since school districts in most states rely heavily on local tax revenues, school expenditures are closely related to local wealth, or the size of the available tax base, as well as other factors such as the community's willingness to tax itself to pay for public education. This close tie between the property tax and school spending often yields strikingly inequitable results: "rich" districts are able to afford high levels of school spending at moderate tax rates while less affluent communities exert a greater tax effort and still spend less per pupil on schools.³⁹

A second way that the current system of school finance is believed to discriminate against the poor is that it makes the opportunity for and the quality of a "child's education a function of the wealth of his parents and neighbors."⁴⁰ Public school finance specialists such as Betsy Levin have found that variations in expenditure levels among school

³⁸John E. Coons, William H. Clune III, and Stephen D. Sugarman, Private Wealth and Public Education (Cambridge: Harvard University Press, 1970), p. 22.

³⁹Weiss, op. cit., p. 2.

⁴⁰Serrano v. Priest, California Supreme Court, 938254, L. A. District 29820 (1971), p. 1.

districts are primarily the result of differences in the amount of money each raises from its own resources.⁴¹ This, in turn, is largely dependent upon the amount of taxable property each district has within its boundaries since virtually all school finance revenues are raised from property taxes.

Several studies have documented the wide variations existing between school districts in the value of taxable property available.⁴² Within a state it is not uncommon for a school district to have three, four, or five times the fiscal capacity of another.⁴³ As noted in the introduction, similar differences in fiscal capacity exist between school districts in South Dakota. There, for example, it was shown that Sully Superimposed had approximately 27 times the tax base that Eagle Butte had available for taxing purposes.

EDUCATIONAL QUALITY AND ITS MEASUREMENTS

As has been suggested, much of the public concern and dissatisfaction with the present system of public school finance stems from the disparities in the quality of education received by children located in different school systems between and within states. Although this has been the case, it must be conceded that educational quality is very

⁴¹Reischauer, op. cit., p. 67.

⁴²See Weiss loc. cit., and Coons loc. cit.

⁴³Reischauer, op. cit., pp. 59-64.

difficult to measure. As Reischauer and Hartman have noted, "it has proven difficult if not impossible to measure and compare the quality of schooling provided by different school districts."⁴⁴ Part of the problem stems from the fact that the quality of services provided by education cannot be adequately measured even with sophisticated "achievement" tests. Compounding this problem is the difficulty of separating the educational opportunities provided by schools from the "influence of native ability, home environment, peer group pressures, and other factors that seem to affect achievement but over which the formal school system has little control."⁴⁵ Considering these problems, analysts in the area of school finance have been forced to rely on expenditures devoted to educate each pupil as a proxy to measure educational quality.⁴⁶

For a number of reasons, current expenditures per student must be interpreted cautiously as an indicator of education quality. First, expenditure differences may fail to reflect the true variations in educational quality devoted to education because of the differences in the efficiency with which school districts operate.⁴⁷ Studies have shown

⁴⁴ Ibid., p. 60.

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ Ibid.

for instance, that in some cases high expenditures merely reflected inefficiency on the part of some school districts, particularly those jurisdictions having small enrollments.⁴⁸

Current expenditures per student may also be deficient in assessing a district's educational program since a dollar may buy different amounts of educational inputs in different parts of a state or parts of the United States.⁴⁹ Studies have shown that cost differences for land vary widely depending upon where a school district is located.⁵⁰ The same has been found true for variations in the salaries needed to attract teachers with commensurate quality across school districts.⁵¹ In both cases tremendous expenditures by a school district may not be an indication of the "true" quality of the educational programs offered to the students. Rather, because of a school's particular location, larger expenditures may be necessary to allow it to provide educational inputs that are available to other districts at much lower cost.

⁴⁸Weiss, op. cit., p. 15.

⁴⁹Reischauer, op. cit., p. 61.

⁵⁰S. P. Marland, Jr., "Education's Rigged Lottery" (speech delivered to the National Association of State Boards of Education, Atlanta, Georgia, October 12, 1971; processed), pp. 5-6, cited by Reischauer, loc. cit.

⁵¹James W. Guthrie and others, Geographic Distribution of Teaching Talent, Citizens for the Twenty-First Century (Sacramento: State Boards of Education, 1969), cited by Reischauer, loc. cit.

Despite the inherent pitfalls in using current expenditures per student as a proxy for the quality of education offered by different school districts, it is the most common proxy used to compare jurisdictions. Furthermore, as Austin D. Stevenson and other educators have conceded, availability of revenue is important in determining a district's expenditures since the larger the income available, the more a district or school can buy educational goods and better professional services.⁵² Hence, with the realization that it represents only a very rough proxy, current expenditures per student is perhaps the best indirect indicator of educational quality available and will be so used in this study.

THE KANSAS CITY STUDY

A two part study of the school property tax and school finance was conducted for the Kansas City Metropolitan Statistical Area by Stephen F. Leroy and Peggy Brockschmidt in 1972. The study appeared in the November and December, 1972 issues of the Kansas City Federal Reserve Bank's Monthly Review.⁵³ In the study the authors considered only the impact of that portion of the property tax used to finance schools and treated only the tax on residences. Several reasons were

⁵²Austin D. Swanson, "The Cost-Quality Relationship," The Challenge of Change in School Finance, Proceedings of The Tenth Conference on School Finance. (Washington; National Educational Association, 1967), pp. 151-164.

⁵³Stephen F. Leroy and Peggy Brockschmidt, "Who Pays the School Property Tax," Monthly Review (Kansas City: Federal Reserve Bank, November 1972), p. 3.

cited for the restrictions. First, attention was focused on the school tax in order to develop data that would directly contribute to the second part of the study on school finance. Second, data on the school property tax is much easier to obtain than data for the overall property tax due to overlapping tax jurisdictions. Finally, the tax on commercial and industrial properties was deleted because their inclusion would have required arbitrary assumptions on the extent to which the burden of the business property tax is shifted forward to consumers by adding the taxes to the prices consumers pay for products.⁵⁴

The study utilized the indirect approach for calculating the impact of the property tax. Essentially this involved expressing the tax as a function of assessed housing value and tax rate which were in turn related to income. The procedure was described above. Log linear regression was the statistical procedure employed. The data necessary for the analysis was obtained from appropriate school authorities and the 1970 Census reports.

The results of the regressions are depicted in the following equations:

- (1) $\log \text{Housing} = +0.882 \log \text{Income} + \text{constant}$
- (2) $\log \text{Tax Rate} = +0.215 \log \text{Income} + \text{constant}$ ⁵⁵

Since the data are in logarithmic form, the regression coefficient equals

⁵⁴Ibid., p. 4.

⁵⁵Ibid., p. 11.

the percentage change in the dependent variable given a one percent change in the independent variable. Referring to equation (1), a one percent increase in median income would lead to a .882 percent increase in housing. Therefore, the interpretation of equation one is that a one percent rise in median income leads to a less-than-proportional increase in housing. Similarly, equation (2) shows that the tax rate is positively correlated with income but less than proportionately. Leroy and Brockschmidt summarize the equations as follows:

Since the sum of the coefficients of income, 1.097 percent, is slightly greater than one, the interpretation of the regression is that the property tax payments increase approximately in proportion to income changes. This implies that the proportion of income paid in property taxes is approximately the same at different income levels, which in turn means that the property tax is approximately proportional in its incidence.⁵⁶

The second part of Leroy and Brockschmidt's study entitled "The Property Tax and School Finance," focused on obtaining "relatively accurate information about the nature and extent of financial disparities among school districts in the Kansas City area induced by their general reliance on the local property tax."⁵⁷ Specifically this involved an analysis of variations in current expenditures per student which was the measure they employed to indicate financial support for education among the different school districts.

⁵⁶Ibid., p. 11.

⁵⁷Stephen F. Leroy and Peggy Brockschmidt "The Property Tax and School Finance," Monthly Review (Kansas City: Federal Reserve Bank, December 1972), p. 4.

To facilitate this analysis the authors identified seven variables which were hypothesized to influence current expenditures per student. Variations among these determinants were felt to be partially responsible for differences in current expenditure per student among the various school districts.⁵⁸ To analyze the magnitude of the financial disparities among the school districts, the authors employed multiple correlation analysis. The results and the seven variables are depicted in Table II-1. By examining the correlation coefficients the authors found it possible to identify the types of financial characteristics of school districts which may have led to high expenditures per student. The authors' observations were:

School districts with high expenditure per student tend to have both high assessed values per student and high tax rates. This is indicated . . . by correlation coefficients of +0.57 and +0.60, respectively. In addition, the correlation coefficient of -0.75 between current expenditure per student and the ratio of total expenditure to property tax revenue implies that school districts with high current expenditure per student typically generate a high proportion of their total revenue from the property tax, receiving a correspondingly small proportion of their budget from state and federal sources. Another finding is that such districts do not tend to have high median housing values. In fact, the correlation coefficient between current expenditure per student and median housing value is 0.00, indicating that there is no association whatever between the two variables. This result may appear surprising, since it might be expected that residents of school districts with high median housing values would be able to afford a greater-than-average investment in education.⁵⁹

⁵⁸Ibid., pp. 4-5

⁵⁹Ibid., pp. 10-11.

TABLE II-1

CORRELATIONS BETWEEN CURRENT EXPENDITURE PER STUDENT
AND ITS DETERMINANTS

Assessed Value Per Student	School Tax Rate	Total Exp./ Tax Revenue	Current Exp./ Total Exp.	Median Housing Value	Households Per Student	Total/ Residential Value	
.57	.60	-.75	.30	.00	.44	.11	Current Exp. Per Student
	.08	-.61	-.20	.06	.42	.46	Assessed Value Per Student
		-.57	.28	.16	-.08	-.19	School Tax Rate
			-.31	-.21	-.23	-.18	Total Exp./Tax Revenue
				-.12	.12	-.16	Current Exp./Total Exp.
					.03	-.61	Median Housing Value
						-.31	Households Per Student

Source: Leroy and Brockschmidt, "The School Property Tax and School Finance," Monthly Review (Kansas City: Federal Reserve Bank, December 1972), p. 8.

The authors concluded that "reliance on the local property tax to finance schools does not systematically discriminate against the poor."⁶⁰

SUMMARY

To a large degree, criticism of the property tax has focused on the belief that the tax has a regressive impact. Several studies have been undertaken to ascertain the validity of such criticism. Studies utilizing current income as the base have typically found the tax to be regressive. Studies employing a proxy of long term average income have typically found the tax to be proportional or even progressive. As alternative methods of appraising the impact of the property tax, the former biases the estimate of the tax impact toward regressivity and the latter towards progressivity. It is clear, then, that both types of study should be considered when evaluating the property tax.

The heavy reliance on the local property tax for revenue for education has been a second area of concern to those involved with school finances. First, the concern is whether the present system of finance can provide for the future revenue needs of education given the recent taxpayer revolt in the form of frequently rejected bond issues. Secondly, the property tax is believed to discriminate against property and, thus, against people depending upon where they chose to live, making a child's education a function of the wealth of his parents and neighbors.

⁶⁰Ibid., p. 13.

CHAPTER III

SOUTH DAKOTA SCHOOL FINANCE

The purpose of this chapter is to present a general discussion of recent trends in the financial and organizational framework within South Dakota's elementary and secondary public school system. To begin, the discussion is devoted to recent trends in the financial support of public education in the state. This is followed by a discussion of recent developments in the reorganization of the state's educational system. Finally, the last part of the chapter presents an analysis of trends in elementary and secondary school enrollment.

FINANCIAL SUPPORT OF PUBLIC EDUCATION

Educational Revenue

Financial resources for the support of South Dakota elementary and secondary education come from three sources: the federal government, the state government and the portion raised locally.⁶¹ Table III-1 depicts the amount of revenue from each source for the ten school years from 1962-63 through 1971-72. As shown, the amount of revenue for education in the state has increased every year throughout this period reaching \$144,410,978 in 1971-72, or an increase of 85 percent over the 1962-63 school year. One further observation is the heavy reliance on

⁶¹Locally raised revenue includes that contributed by the county.

TABLE III-1

SOUTH DAKOTA ELEMENTARY AND SECONDARY PUBLIC
SCHOOL RECEIPTS BY SOURCE, 1962-72

School Year	Federal			State		Local	
	Total	Dollars	Percent	Dollars	Percent	Dollars	Percent
1962-63	\$ 77,770,744	\$ 5,553,282	7.1	\$ 6,525,756	8.4	\$ 65,691,706	84.5
1963-64	82,699,817	5,517,745	6.7	6,652,834	8.0	70,529,238	85.3
1964-65	91,534,743	4,271,822	4.7	7,781,302	8.5	79,481,619	86.8
1965-66	97,979,141	8,447,829	8.6	9,595,739	9.8	79,935,573	81.6
1966-67	105,174,804	10,184,764	9.7	10,958,966	10.4	84,031,074	79.9
1967-68	109,725,865	11,586,468	10.6	11,582,691	10.6	86,556,706	78.8
1968-69	118,673,566	11,607,723	8.9	12,746,472	10.7	94,319,371	79.5
1969-70	126,549,957	12,286,201	9.7	15,576,601	12.3	98,687,155	78.0
1970-71	128,685,677	13,669,198	10.6	18,428,451	14.3	96,588,028	75.0
1971-72	<u>144,410,978</u>	<u>17,856,404</u>	<u>12.4</u>	<u>19,702,743</u>	<u>13.6</u>	<u>106,851,831</u>	<u>74.0</u>
Ten Year Total	\$1,083,205,292	\$100,981,436	9.4	\$119,551,555	11.0	\$862,672,301	79.6

Source: Department of Public Instruction, Educational Statistics Digest (Pierre: State Publishing Co., 1962-63 through 1971-72), various pages.

locally raised revenue for the support of education in the state. During the 10 year period on the average, nearly 80 percent of the total revenue came from local resources (although in recent years the percentage has been decreasing) with the remaining 20 percent contributed in nearly equal proportions by the federal and state governments.

In this respect, South Dakota differs substantially from most states in the method of financing elementary and secondary education. The data presented in Table III-2 shows the proportion of revenue from local, state, and federal sources for South Dakota, six neighboring states, and the United States for the school year 1970-71.⁶² South Dakota, with 73.9 percent of total education revenue coming from local sources, is well above the national average of 52.0 percent. The state provides only 15.1 percent of total school revenue; this is substantially less than the national average of 41.5 percent and is less than any of the six neighboring states. South Dakota fares well in federal aid, receiving 10.9 percent from this source as compared with only 6.9 percent for the nation as a whole.

One consequence of the heavy reliance on local resources is the close tie it creates between the total revenue available for education and the property tax. The tax, as mentioned in the introduction, accounts for more than 95 percent of all locally raised tax revenue. Further, a close relationship exists between locally collected property taxes and

⁶²Note that the percentage of total revenue for each source differ between Table III-1 and Table III-2 for the 1970-71 school year. This is probably due to the figures in Table III-1 being updates of the estimates given in Table III-2.

TABLE III-2

FEDERAL, STATE, AND LOCAL PRIMARY AND SECONDARY EDUCATION
REVENUE IN SOUTH DAKOTA, SIX NEIGHBORING STATES,
AND THE UNITED STATES, 1970-71.

Geographical Area	Percent of Revenue Receipts for Public Schools by Source		
	Federal	State	Local
South Dakota	10.9	15.1	73.9
United States	6.9	41.1	52.0
Iowa	3.1	29.2	67.7
Minnesota	4.6	43.2	51.9
Montana	8.0	24.0	68.0
Nebraska	6.6	17.6	75.8
North Dakota	8.0	25.8	66.2
Wyoming	22.6	25.8	51.6

Source: U. S. Department of Health, Education, and Welfare, Digest of Educational Statistics (Washington: U. S. Government Printing Office, 1971), p. 52.

general fund receipts from which public school operating funds are derived. This is depicted in Table III-3 for the years 1962-63 to 1971-72. For the 10 year period 70.4 percent of total general fund receipts came from locally collected property taxes. Furthermore, even though the tie between the two decreased over the ten year period, the proportion of the general fund receipts made up of property taxes was substantial and far greater than that in most states.

Another recent trend in educational revenue that needs to be considered is the role of state support. As has been previously shown, support to primary and secondary education by the state of South Dakota is far below the national average even though it has been increasing in recent years. What remains to be noted is the distribution of this state aid.

Direct state aid is distributed according to the provision of the SDC, 1960 Supplement 15.2246, as last amended in 1968, more commonly called the Minimum Foundation Program Law.⁶³ Under this law aid is distributed in two forms: flat grants and equalization. Flat grant aid is distributed to each school district primarily based on the number of classroom units in the district. The number of classroom units, in turn, is determined by a weighting formula which considers the number of students to be educated within a district.

⁶³Department of Public Instruction, Computing Minimum Foundation Aid for Independent School Districts for the 1968-69 School Year (Pierre: State Publishing Co., 1968), mimeograph.

TABLE III-3

RELATIONSHIP BETWEEN THE PROPERTY TAX AND TOTAL GENERAL RECEIPTS FOR
ELEMENTARY AND SECONDARY SCHOOLS IN SOUTH DAKOTA, 1962-72

School Year	Total District Tax	Total General Receipts	Total District Tax as Percent of Total General Receipts
1962-63	\$ 48,284,332	\$ 63,081,756	76.54
1963-64	52,473,990	69,207,555	75.82
1964-65	55,450,129	74,267,812	74.66
1965-66	57,680,372	81,401,834	70.85
1966-67	60,690,115	88,438,987	68.62
1967-68	64,272,985	91,255,947	70.43
1968-69	69,808,664	101,092,970	69.05
1969-70	74,786,323	109,578,126	68.24
1970-71	82,348,430	121,652,166	67.69
1971-72	<u>88,012,385</u>	<u>127,830,620</u>	<u>68.85</u>
Ten Year Total	\$653,807,725	\$927,807,773	70.42

Source: Department of Public Instruction, Educational Statistics Digest (Pierre: State Publishing Co., 1962-63 through 1971-72), various pages.

The equalization aid provided for by this law is distributed on the basis of each districts' ability to support an educational program. To qualify for this aid, a school district must incur cost over and above a statutory limit set for each classroom unit and tax its properties at a stated minimum in mills after adjustments have been made to bring assessments to the state average. The purpose of this aid is partially to offset the differences in the revenue raising capacities of different school districts.

State law also provides for one further type of aid to education, transportation aid.⁶⁴ The distribution of this aid is based upon a set number of dollars per eligible pupil, which in turn, depends on the pupil's residence and whether he requires busing services. The amounts given to different districts is determined by multiplying a set dollar figure times the number of eligible pupils within the school district.

Table III-4 depicts the distribution of state aid to independent school districts in 1971-72.⁶⁵ Of particular note is the relatively large proportion (42.7 percent) allocated through flat grants and the relatively small proportion (18.9 percent) allocated for equalization purpose. It can be hypothesized, therefore, that if wealthy school districts in the state typically are also the larger school districts, allocation of state

⁶⁴Office of Secretary of State, South Dakota Compiled Laws, 1965 (Indianapolis: The Allen Smith Co., 1967) pp. 186-87.

⁶⁵Independent school districts are those which operate schools or contract with other states for education of grades kindergarten to grade 12 (K-12). Common school districts operate schools instructing grades K-8.

TABLE III-4

DISTRIBUTION OF STATE AID TO INDEPENDENT SCHOOL DISTRICTS
IN SOUTH DAKOTA, 1971-72

Sources and Type of State Support	Amount of State Support	Percent of Total
<u>Legislative Appropriation</u>		
Transportation to Local School District	2,759,921	14.3
Flat Grant to Local School Districts	8,227,653	42.7
Equalization to Local School Districts	<u>3,639,725</u>	<u>18.9</u>
TOTAL	14,627,299	75.9
<u>Apportionment</u>	3,511,587	18.2
<u>Miscellaneous</u>	<u>1,118,310</u>	<u>5.8</u>
GRAND TOTAL	19,257,969	100.0

Source: Department of Public Instruction, Educational Statistics Digest
(Pierre: State Publishing Co., 1972), pp. 34-40.

aid to a far greater extent by flat grants than for equalization purpose, may be aggravating the already existing financial disparities among school districts in the state.

Educational Expenditures

The way in which financial resources are disbursed constitutes a significant dimension of South Dakota's elementary and secondary school finance. A historical picture of the state's public school expenditures is presented in Table III-5. During the ten year period depicted, total expenditures increased from \$73,062,246 in 1962-63 to \$136,584,672 in 71-72, or approximately an 87 percent increase.

The table also depicts recent trends in school expenditures for each of the three accounting divisions: the general fund, the capital outlay fund and the bond redemption fund. Although expenditures in each of these funds have increased considerably, the proportionate amount allocated to each has remained relatively constant throughout the ten year period. For example, in 1962-63 the percentage allocated was 82.3 for the general fund, 12.8 for capital outlay, and 3.9 for bond redemption. In 1971-72, these percentages were 89.1, 7.2, and 3.2, respectively.

Many factors have been influential in increasing educational costs in South Dakota. A recent statewide study emphasized the following:

Total enrollments have increased for a variety of reasons such as the expansion of kindergarten classes, the introduction of programs for students with special needs (i.e. special education), the increased interest in high school education, the development of vocational schools, and the introduction of adult education programs. While this list is not inclusive, it does point out the diversification and expansion of educational offerings in response to

TABLE III-5

TRENDS IN SOUTH DAKOTA SCHOOL EXPENDITURES
FOR THREE ACCOUNTING DIVISIONS,
1962-63 to 1971-72

School Year	General Fund	Capital Outlay	Bond Redemption	Total	Percentage Change Over Previous Year
1962-63	\$ 60,794,885	\$ 9,414,857	\$2,852,503	\$ 73,062,246	---
1963-64	65,617,935	6,055,115	3,030,019	74,703,069	2.2
1964-65	69,186,465	10,655,307	3,096,411	82,938,183	11.0
1965-66	75,395,178	13,786,696	3,499,489	92,681,363	11.7
1966-67	83,182,270	14,677,944	3,980,235	101,840,499	9.9
1967-68	89,144,055	13,478,566	4,224,034	105,846,655	4.9
1968-69	95,794,355	15,198,976	4,747,907	115,721,238	9.3
1969-70	104,241,539	13,831,320	4,702,786	122,775,645	6.0
1970-71	113,688,574	12,311,019	4,903,858	130,903,451	6.6
1971-72	121,721,528	9,931,940	4,931,204	136,584,672	4.5

Source: Department of Public Instruction, Educational Statistics Digest (Pierre: State Publishing Co., 1963 to 1972), various pages.

changing needs. Other reasons for increased expenditures include the lengthening of the school year, the employment of larger numbers of highly trained teachers, the provision of more instructional materials, the rising school construction costs, and the general impact of inflation.⁶⁶

The consequence of these trends has been the need for high expenditures to educate the pupils in the State's public schools. The magnitude for these increases is depicted in Table III-6. Shown are the average expenditure per pupil in the State's elementary and secondary schools from 1962-63 to 1971-72. During this ten year period the cost of educating one student has risen 107.7 percent. All indications would lead one to expect the expenditure trend to continue to increase, making it necessary to allocate more money to education.

SOUTH DAKOTA'S SCHOOL SYSTEM

The structural organization of a state's educational system is very important since it provides the mechanism by which policies are implemented and goals are achieved. Over time, educational systems are in a state of flux, changing in response to social, technological, political, and educational developments. In this respect South Dakota's educational system is no exception.

During the early part of South Dakota's history, the state witnessed a predominance of rural one-teacher schools, who's legal status

⁶⁶Charles A. Sederberg, Education: South Dakota, A Statewide Study of Public Schools (Minneapolis, Bureau of Field Studies and Surveys, University of Minnesota, 1969), p. 186.

TABLE III-6

PER PUPIL EXPENDITURES IN SOUTH DAKOTA PUBLIC ELEMENTARY
AND SECONDARY SCHOOLS, 1962 to 1972

School Year	Cost per Pupil	Percentage Change	
		From Prior Year	From 1962-63
1962-63	374.00	---	---
1963-64	392.92	5.0	5.0
1964-65	408.76	4.0	9.2
1965-66	447.41	9.4	19.6
1966-67	496.58	10.9	32.7
1967-68	536.51	8.0	43.4
1968-69	601.50	12.1	60.8
1969-70	657.50	9.3	75.8
1970-71	716.04	8.9	91.4
1971-72	776.90	8.4	107.7

Source: Department of Public Instruction, Educational Statistics Digest (Pierre: State Publishing Co., 1971-72), p. 2.

was that of common school districts. At that time, the state's economy was predominately of a nonmechanized agricultural nature; hence the educational needs of the majority of the state's population was adequately met by an elementary education in basic skill subjects. The one-teacher school was ideally suited for this purpose. In 1931, South Dakota had 3,499 school districts, most of which were common elementary school districts operating rural schools.⁶⁷ Since that time, however, the number of school districts has declined markedly for a variety of reasons.

A major reason for the decline of the common school districts has been the growing importance of secondary education. Due mainly to the growing complexities of everyday life, higher levels of education for all citizens has become a necessity. For the most part this has meant the need for school districts which offer educational programs from grades K-12. As a result, independent school districts have emerged as the pre-

dominate educational structure in South Dakota's educational system. Another important reason for the decline in the number of common school districts has been the leadership of the South Dakota state legislature. They have been instrumental in providing the mechanism for reorganization of the state's educational system. For the most part this has been accomplished through the reduction in the number of common school districts and the enlargement in the size of independent school districts

⁶⁷ Ibid., p. 186.

both as a result of consolidation with common school districts and, in some instances, the merger of independent school districts that were considered too small to operate efficiently.⁶⁸

The laws which have facilitated the reorganization of South Dakota's school districts are summarized below.⁶⁹

Reorganization Laws

Chapter 18, 1951 Session Laws

Chapter 41, 1955 Session Laws

Chapter 38, 1967 Session Laws

Major Provisions

Created a county board of education for the reorganization of school districts.

Called for county master plans of district organization and minimum standards by the State Board of Education.

Created an Elementary and Secondary Commission charged with assigning nearly all common districts in the state to an independent district by July 1, 1970.

Of these, the latter, Chapter 38 of the 1967 Session Laws, or as it is more commonly known, Senate Bill 130, has had and is likely to continue to have the greatest impact. This law calls for the assignment of all lands in the state to independent school districts offering grades 1-12 with the only exceptions being lands located in superimposed school districts or in districts contracting with another state.

⁶⁸Ibid., p. 185.

⁶⁹See Ibid.

The impact of these laws is depicted by data in Table III-7. This data indicates that prior to the 1964-65 school year relatively little reorganization had taken place. Beginning with that year and continuing throughout the next four years reorganization began to pick up steam with a reduction in the number of school districts averaging nearly 11 percent per year. It was in the 1968-69 school year following the implementation of Senate Bill 130, however, that the most drastic reductions began to occur. This continued until 1970-71 when a record 62.2 percent of the then existing school districts discontinued operation.

Thus, there has been a dramatic decrease in the number of school districts in South Dakota. In 1962-63 there were a total of 2,926 school districts compared with 233 in the 1971-72 school year, which represents a decrease of over 92 percent. For the most part this decrease has been accomplished through the 98 percent reduction in the number of common school districts, compared to the reduction of independent school districts by only 20 percent for the 1962-72 period.

PUBLIC SCHOOL ENROLLMENTS

One important factor in determining the future expenditure needs in South Dakota is the enrollment trends in the state's public elementary and secondary schools. Although a detailed analysis of these trends is beyond the scope of this study, a brief look at recent developments will suffice to give an indication of the educational task the state's schools will likely be faced with in the future.

TABLE III-7

NUMBER AND TYPES OF LOCAL SCHOOL DISTRICTS IN SOUTH DAKOTA,
1962 to 1972

School Year	Independent	Common	Total	Reduction From Previous Year	
				Number	Percent
1962-63	245	2,681	2,926	---	---
1963-64	244	2,629	2,873	53	1.8
1964-65	240	2,368	2,607	265	9.2
1965-66	235	2,095	2,330	277	10.6
1966-67	225	1,789	2,014	316	13.6
1967-68	215	1,582	1,797	217	10.8
1968-69	216	990	1,206	691	38.5
1969-70	208	551	759	447	37.1
1970-71	201	86	287	472	62.2
1971-72	195	38	233	54	18.8

Source: Department of Public Instruction, Educational Statistics Digest
(Pierre: State Publishing Co., 1962-63 through 1971-72), various
pages.

Total enrollments in South Dakota's public elementary and secondary schools for the period 1962-63 through 1971-72 are reported in Table III-8. These data indicate that during the ten year period total enrollments in these schools increased by only 2.05 percent. More importantly, however, is the fact that since 1968-69--with the exception of 1970-71--the state's elementary and secondary schools have witnessed an actual decline in enrollments which has resulted in the enrollment for 1971-72 being at about the same level as it was in the 1964-65 school year.

A number of factors have been responsible for these enrollment trends not the least of which has been the net decrease in population South Dakota sustained in the decade of the 60's. During this ten year period, according to the 1970 Census, the state experienced a net decrease in population of 2.2 percent. This phenomenon, in turn, can be explained by a number of factors. One such factor has been the widespread out-migration evidenced in the state during this period. A study by Marvin Riley and James Pew of South Dakota out-migration patterns of young adults aged 24-30 for the period 1950-1960 is suggestive of this pattern. They found that only four counties in the state experienced a net in-migration of young adults whereas the state's other 63 counties all experienced a net out-migration ranging from 9.0 to 56.0 percent.⁷⁰

Another important factor accounting for the state's decreased

⁷⁰Marvin P. Riley and James E. Pew, Pamphlet No. 122, The Migration of Young Adults, 1950-1960 (Brookings: South Dakota State University, November 1967), pp. 21-24.

TABLE III-8

TOTAL ENROLLMENT IN SOUTH DAKOTA PUBLIC ELEMENTARY
AND SECONDARY SCHOOLS, 1962 to 1972

School Year	Enrollment	Percentage Change	
		1962-63	Prior Year
1962-63	168,173	---	---
1963-64	170,224	1.22	1.22
1964-65	171,958	2.25	1.02
1965-66	172,965	2.84	0.58
1966-67	175,252	4.20	1.32
1967-68	175,654	4.44	0.23
1968-69	173,791	3.34	-1.06
1969-70	172,616	2.64	-0.68
1970-71	173,006	2.87	0.23
1971-72	171,636	2.05	-0.79

Source: Department of Public Instruction, Educational
Statistics Digest (Pierre: State Publishing Co.,
1971-72), p. 2.

population and hence the recent school enrollment declines has been the reduction in annual resident births in the state since 1955. In the nine year period from 1960-68 the state experienced a net decline in residential births of 34.5 percent.⁷¹

The trends of elementary and secondary enrollments are depicted in Table III-9. Lower elementary grades in the state's public schools have long experienced enrollment declines. At this level decreases in enrollment have been sustained in all but one year over the 10 year period. Although there was a substantial overall increase in enrollment during the period for the secondary level, recent years have shown a considerable moderation in the magnitude of increase, especially during the late 60's and into the early 70's.

In light of these trends most projections for future school enrollment look for a continuing decline. One such projection anticipates that by 1977-78 the enrollment at the elementary level (K-8) will be 33.6 percent less than it was in 1967-68. For the secondary level (9-12) enrollment for 1977-78 school year is anticipated to be 8.8 percent less than in 1967-68.⁷² Of course, these projections must be used with caution but if past trends continue one would expect these projections to have at least some merit.

⁷¹Charles A. Sederberg, op. cit., p. 282.

⁷²Ibid., p. 296.

TABLE III-9

DISTRIBUTION OF ENROLLMENT BY ELEMENTARY (K-8) AND SECONDARY (9-12)
LEVELS IN SOUTH DAKOTA, 1962 to 1972

School Year	Elementary	<u>Percentage Change</u>		Secondary	<u>Percentage Change</u>	
		1962-63	Prior Year		1962-63	Prior Year
1962-63	125,284	---	---	43,222	---	---
1963-64	124,319	-0.78	-0.78	45,905	6.20	6.20
1964-65	124,381	-0.73	0.04	47,577	10.07	3.64
1965-66	124,199	-0.87	-0.15	48,766	12.82	2.49
1966-67	125,082	-0.17	0.71	50,170	16.07	2.87
1967-68	124,747	-0.43	-0.27	50,907	17.78	1.46
1968-69	122,346	-2.35	-1.93	51,445	19.02	1.05
1969-70	120,645	-3.71	-1.40	51,971	20.24	1.82
1970-71	119,897	-4.30	-0.63	53,109	22.87	2.18
1971-72	118,054	-5.78	-1.54	53,582	23.96	0.89

Source: Department of Public Instruction, Educational Statistics Digest (Pierre: State Publishing Co., 1962-63 to 1971-72), various pages.

SUMMARY

Before an investigation into a state's system of school finance can be undertaken, it is necessary to have some background knowledge of recent trends in the area. This chapter has presented several of the recent trends in South Dakota's school finance during the ten year period 1962-63 to 1971-72.

Within this discussion, a number of interesting observations concerning the state's system of school finance have surfaced. Beginning with the revenue side, it was noted that South Dakota differs substantially from most of the nation in the method of supporting elementary and secondary education. Specifically, this stemmed from the heavier reliance on locally raised revenue and the relatively small annual contributions by the state government for the support of education at these levels. On the expenditure side of the picture, one overriding observation was the phenomenal increase in the cost of elementary and secondary education in the state. The increase in expenditures occurred with only minor increases in student enrollments and, in later years, declining enrollments. As was seen, however, expenditures per pupil at these levels increased every year and more than doubled over the ten year period.

Subsequent to the need for information about the past trends in school finance was the necessity to have some information about the changing organizational structure of the state's educational system. In this area, the observed trend was a tremendous decline in the number of school districts in the state mainly facilitated by a large reduction in common

school districts. Further, recent legislation has called for a statewide system of independent school districts in the immediate future.

One final trend observed was that of school enrollments. As was seen, during the ten year period 1962-63 to 1971-72, South Dakota schools witnessed a very slight increase in total elementary and secondary enrollments. More important, however, is the fact that since the 1968-69 school year, enrollments have actually decreased resulting in the 1971-72 enrollment to be at about the same level as in the 1964-65 school year. Furthermore, all projections for the future look for this trend to continue over the next several years. Hence, it is very likely that for several years to come a smaller number of students will need to be educated. This does not necessarily mean that expenditures will decrease, however, since expenditure levels are determined by many factors other than the number of students.

of independent districts and the fact of enrollment trends in particular districts' schools. South Dakota has a large number of schools having kindergarten through high school, and a few high schools. There were 10,000 students in the state in the 1971-72 school year compared to 10,000 in the 1964-65 school year. Independent school districts are being established in South Dakota at a rapid rate. The following are the independent districts which are either:

1. Operate a high school only.
2. Operate as an independent district in the state.

CHAPTER IV

AN ANALYSIS OF THE IMPACT OF SCHOOL PROPERTY TAX

IN SOUTH DAKOTA

The purpose of this chapter is to present the results of an analysis of the impact of the school property tax on residential properties in selected school districts in South Dakota. The first part of the chapter presents the methodology employed in the study. The second part presents the results of the two step indirect approach utilized to ascertain the impact of the tax.

METHODOLOGY

The Sample

School districts in South Dakota are classified either as common or independent depending upon the level of instruction within a particular districts' schools. Common school districts are those that operate schools having kindergarten through grade eight (K-8) but do not have a high school. There were 38 such districts in South Dakota in the 1971-72 school year selected for this study. The second classification--independent school districts--is comprised of those districts which either:

1. Operate a four-year high school or
2. Contract with an independent district in another state for the education of the district's children or

3. Maintain schools having kindergarten through grade twelve (K-12).

There were 195 of these school districts in the state in the 1971-72 school year. This total was comprised of five districts having only a four year high school, ten districts contracting with another state and 180 districts having grades K-12.⁷²

In this study, however, only the latter 180 school districts, those that operated schools having grades K-12 were considered. There are three reasons for the restriction. First, the study is designed to determine the impact of the property tax in South Dakota which necessitates excluding those districts which contract with another state since such data reflects the joint effort on the part of the citizens of both states. Second, the data for the other two types of school districts proved to be inaccurate. Finally, the reorganization of school districts in South Dakota has been in the direction of districts having grades K-12 and a study limited to these districts is the most beneficial.

One further restriction was placed on the selection of districts. This stemmed from the unavailability of data for two computed variables--median household income and median housing values. Because the U. S. government has a policy of suppressing data when it is believed that its disclosure would allow identification of the participants involved,

⁷²Department of Public Instruction, op. cit., p. 1.

obtaining sufficiently reliable estimates of the two variables proved difficult for 100 of the 180 districts.

From the remaining 80 districts, a stratified random sample of 18 school districts was chosen. By this procedure the state was stratified into four areas based on population and economic characteristics. School districts were chosen from each area at random, the number of which depended upon the number of school districts located in an area. The procedure was used in an attempt not to understate (overstate) the more densely (sparsely) populated areas in the state. Figure 4-1 depicts the state divisions and the number of school districts chosen from each area.

Source of Data

Data requirements for the impact analysis in South Dakota were similar to those in the Kansas City study discussed in Chapter 2. It was necessary to obtain data to compute measures for (1) median household income, (2) median value of housing and, (3) school tax rate for each of the 18 school districts. The sources and the computational procedures are discussed below for each variable.

To estimate median household income for each of the 18 school districts, the study used 1970 Census data compiled by the Bureau of Census of the U. S. Department of Commerce. The Census publication for the State of South Dakota was of no help in this respect however, since it listed median household income by county rather than by school district.

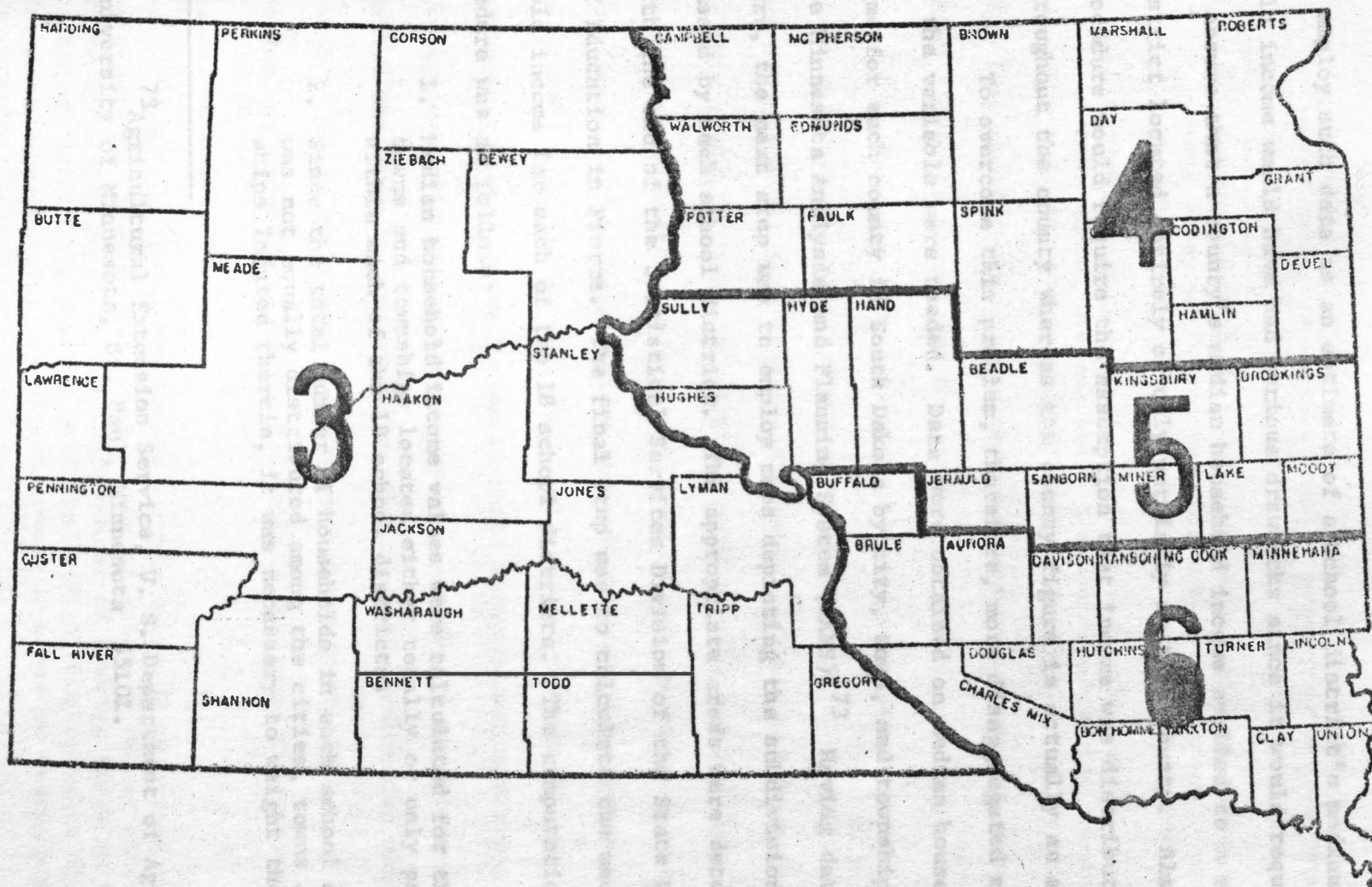


FIGURE IV-1

THE FOUR AREA DIVISIONS OF SOUTH DAKOTA AND THE NUMBER OF
SCHOOL DISTRICTS CHOSEN FROM EACH DIVISION

To employ such data as an estimate of a school district's median household income would have had serious drawbacks since it would require one to assume that a county's median household income applied to a school district located entirely or only partially in that county. Also, the procedure would require the assumption that income was distributed evenly throughout the county whereas the county figure is actually an average.

To overcome this problem, therefore, more disaggregated measures of the variable were needed. Data were obtained on median household income for each county in South Dakota by city, town, and township from the Minnesota Analysis and Planning System (MAPS).⁷³ Having data in this form, the next step was to employ maps depicting the subdivisions encompassed by each school district. The appropriate areas were determined with the aid of the Statistical Services Division of the State Department of Education in Pierre. The final step was to calculate the median household income for each of the 18 school districts. The computational procedure was as follows:

1. Median household income values were calculated for the cities, towns and townships located either totally or only partially within each of the 18 school districts.
2. Since the total number of households in each school district was not equally distributed among the cities, towns and townships located therein, it was necessary to weight the

⁷³ Agricultural Extension Service, U. S. Department of Agriculture, University of Minnesota, St. Paul, Minnesota 55101.

Since the total number of households in each school district was small, the overall estimated median housing value for the school districts were probably biased upward to a severe degree and the errors are expected to be intolerable.

subdivisions accordingly. Thus, weights were established for each entity by calculating the proportion of the total number of households in a district located in each entity.

3. Weighted median household income values were calculated for each town, city, and township within each school district by multiplying median income values by the corresponding weights.
4. Finally, each entity's weighted median household income values were added, the sum being the estimated median household income for the school district as a whole.

Table IV-1 shows the estimated median household income for each of the 18 school districts chosen for the study.

The procedure for calculating the median value of housing for each school district was similar to that above. Again, it was necessary to obtain more disaggregated data from the Minnesota Analysis and Planning System. For this variable, however, MAPS was only able to provide data listing owner-occupied units within cities, towns, and townships for each of the counties in South Dakota. Since the median household figures discussed above reflect income of renters as well as home-owners, it was necessary to incorporate the value of rental units into the estimates for each school district's median housing value. The chosen procedure was to capitalize the rents by assuming that the value of each rented unit within a district was equal to ten times the annual contract rent.⁷⁴ A similar problem was encountered in the Kansas City study and they chose to solve the

⁷⁴For some school districts in this study, this procedure may have overstated the real market value of rental units. However since the proportion of rental units to the total number of housing units in most districts was small, the overall estimated median housing value for the school districts were probably not biased upward to a severe degree and the errors are expected to be tolerable.

TABLE IV-1

MEDIAN HOUSEHOLD INCOME AND MEDIAN VALUE OF
HOUSING FOR SELECTED INDEPENDENT SCHOOL
DISTRICTS IN SOUTH DAKOTA, 1970

School District	Median Household Income	Median Value of Housing
Huron	\$ 9,333.80	\$10,358.34
Sioux Valley	7,054.74	8,603.42
Vermillion	7,947.10	9,927.33
Watertown	10,644.42	10,067.89
Mitchell	8,180.70	9,620.05
Waubay	5,516.60	5,704.33
Astoria	3,666.60	3,807.55
Milbank	8,250.88	10,320.81
Hyde	6,392.80	8,918.00
Lake Preston	6,563.95	5,830.57
Chester	9,269.20	5,042.82
Harrisburg	8,950.00	8,374.36
Meade	8,118.10	12,566.00
Sioux Falls	9,616.70	12,682.07
Baltic	9,571.40	8,690.85
Jefferson	7,981.01	5,941.39
Gayville-Volin	6,731.25	6,409.92
Todd Co.	4,688.77	8,409.61

IV-1 SOURCE: Minnesota Analysis and Planning System, 1970 Census of Population Data, Income Characteristics.

problem in the same way.

Having completed these preliminaries, the next step was to compute the median value of all housing units within each of the 18 school districts in the study. The methodology used for this computation was similar to that discussed for the variable median household income. Specifically this involved:

1. Median value of housing for both renter and owner occupied units were calculated for each town, city, and township encompassed by a school district.
2. Since the total number of housing units in each school district were not equally distributed amongst the towns, cities, and townships, each of these entities had to be weighted accordingly. These weights were established by calculating the proportion of the total number of such units in each of these three entities to the total number for the school district as a whole.
3. Weighted median housing values for each entity were computed by multiplying each individual entity measure of this median housing value by its corresponding weights.
4. Finally, the weighted median housing values for each entity were added together, with the sum being the estimated median value of housing for the school district as a whole.

The procedure was repeated for each of the 18 school districts. Table IV-1 depicts the estimated value of this variable for each.

The final variable to be estimated for the analysis of the impact of the school property tax was the school tax rate per \$100 of assessed valuation. The data necessary for this calculation were obtained from the 1971-72 Educational Statistical Digest, a publication of the State Department of Elementary and Secondary Education.⁷⁵

⁷⁵Department of Public Instruction, op. cit., pp. 13-19.

Since for taxing purposes farm residents are considered as non-agricultural properties, it was possible to use each school district's non-ag mill levy for the estimation. It was necessary, however, to adjust these figures to reflect the tax rates in dollars per \$100 of assessed value. This was done by multiplying the mill rates by 10000 which resulted in the figures being in dollars terms. The values of these variables are shown in Table IV-2.

The Model

A curvilinear regression model was used as the statistical tool to analyze the impact of the property tax. The model represented the relationship between the dependent variable and a single independent variable. The mathematical relationship for the population was:

$$Y = AX^B$$

where Y represents the value of the dependent variable and X represents the value of the independent variable.

By transforming the variables it is possible to greatly simplify the solution to the above equation. Taking the logarithm we get:

$$\log Y = \log A + B \log X.$$

Now letting $U = \log X$, $V = \log Y$, $A^1 = \log A$ and $B^1 = B$, the equation rewrites:

$$V = A^1 + B^1 U.$$

TABLE IV-2

MEDIAN HOUSEHOLD INCOME AND SCHOOL TAX
RATE FOR SELECTED INDEPENDENT SCHOOL
DISTRICTS IN SOUTH DAKOTA

School District	Median Household Income ¹	School Tax Rate* ²
Huron	\$ 9,333.80	\$4.00
Sioux Valley	7,054.74	3.95
Vermillion	7,947.10	3.41
Watertown	10,644.42	4.00
Mitchell	8,180.70	3.99
Waubay	5,516.60	3.80
Astoria	3,666.60	4.00
Milbank	8,250.88	3.43
Hyde	6,392.80	3.05
Lake Preston	6,563.95	3.67
Chester	9,269.20	3.77
Harrisburg	8,950.00	4.00
Meade	8,118.10	3.85
Sioux Falls	9,616.70	4.00
Baltic	9,571.40	4.00
Jefferson	7,981.01	4.00
Gayville-Volin	6,731.25	3.33
Todd Co.	4,688.77	3.54

* per \$100 of assessed value

SOURCES: ¹Minnesota Analysis and Planning System, 1970 Census of Population.

²Department of Public Instruction, 1971-72 Educational Statistics Digest (Pierre: State Publishing Co., 1971), pp. 13-19.

Wiley, Statistical Probability,
John Wiley & Sons, Inc., New York, 1950.

Thus by transforming from the variables $\log X$ and $\log Y$ to the variables U and V , we get a linear function. Furthermore, by having the equation in this form, it is possible to use least squares to estimate the parameters, A^1 and B^1 .⁷⁶

The model in its present form represented the population relationship, which was estimated using sample data. The mathematical relationship for the sample data is:

$$V_c = a^1 + b^1 U$$

Where V_c represented the computed or estimated value of the dependent variable and a^1 and b^1 were the least squares estimates of the population parameters.

For the present study, however, it was better to reconvert this equation into a log-linear function. Since

$$V_c = \log U_c$$

$$U = \log X$$

$$a^1 = \log a$$

$$\text{and } b^1 = b$$

this rewrites

$$\log U_c = \log a + b \log X.$$

The convenience of having the data in logarithmic form is to allow for an easier interpretation of the regression coefficient (b). Since now the

⁷⁶William L. Hays and Robert Winkler, Statistics: Probability, Inference and Decision (New York: Holt, Rinehart, and Winston, Inc., 1970), p. 55.

regression coefficient may be interpreted as the percentage change in the dependent variable induced by a 1 percent change in the independent variable.⁷⁷

ANALYSIS OF THE IMPACT OF THE

SCHOOL PROPERTY TAX

To analyze the impact of the school property tax on residential property, the indirect method was employed.⁷⁸ Such an approach neces-

sitated a two step investigation. First, it was necessary to calculate the effect of a given percentage change in median household income on the former to a given percentage change in the latter. Using the school district data that were shown in Table IV-1 the regression yielded the following:

the statistical tools used for this calculation. The second step involved combining the results of these two log-linear regressions. It was through this combination that the impact of the school property tax on residential property was estimated. In this section we shall present the results of this two step investigation.

Housing Value on Income

In Chapter two, reference was made to recent studies that have brought into question the widely held belief that the value of housing rises greater than the critical t (1.746) at the 95 percent confidence level,

⁷⁷R. G. D. Allen, Mathematical Analysis for Economists (London: Macmillan and Co. Ltd., 1949), pp. 219-223.

⁷⁸This methodology is largely taken from the Leroy-Brockschmidt study discussed in Chapter 2.

⁷⁹Taro Yamane, Statistics, An Introductory Analysis (New York: Harper and Row Publishers, 1967), p. 878.

less than proportionately with income. Furthermore, since this has been a major reason cited by critics to explain the regressive impact of the property tax, these studies have likewise questioned whether the property tax has a regressive impact. To determine the merits of these two conflicting views on the responsiveness of median housing value to changes in income with respect to South Dakota, a systematic examination of the available data was needed.

Log-linear regression of median housing value on median income was the statistical approach employed to estimate the responsiveness of the former to a given percentage change in the latter. Using the school district data that were shown in Table IV-1 the regression yielded the following:

$$\log \text{Housing} = +.68792 \log \text{Income} + \text{constant}$$

$$R^2 = 0.5806$$

$$S_b = 0.14615 \quad t = 4.7075$$

To determine the reliability of the regression coefficient (+.68792) it was necessary to test whether or not this coefficient differs significantly from zero; ($H_0: B = 0; H_1: B \neq 0$). A t-distribution was used for this test. In this instance, the value of the regression coefficient is significantly different from zero since our calculated t (4.7075) was greater than the critical t (1.746) at the 95 percent confidence level, using a right tail test.⁷⁹ Or in other words, the test of the results led to rejection of the hypothesis that a linear relationship between

⁷⁹Taro Yamane, Statistics, An Introductory Analysis (New York: Harper and Row Publishers, 1967), p. 878.

log housing and log income does not exist.

Since the data in the equation are in logarithmic form the regression coefficient equals the percent change in the dependent variable brought about by a 1 percent change in the independent variable. Thus, the interpretation is that a 1 percent increase in median income is associated with a 0.68792 percent increase in median housing value. This result suggests support for the widely held contention that the value of housing rises less than proportionally with increases in income.

Tax Rate on Income

Before estimating the impact of the school property tax it was necessary to analyze one other important relationship. Specifically, this involved the calculation of the effect of a given percentage change in median income on the tax rate. Again log-linear regression was employed in the estimation.

Using the school district data in Table IV-2 the following regression was computed:

$$\log \text{ Tax Rate} = +.11177 \log \text{ Income} + \text{constant}$$

$$R^2 = 0.1384$$

$$S_b = 0.06198 \quad t = 1.80332$$

To determine the reliability of the regression coefficient (+.11177) it was again necessary to test whether or not the coefficient differed significantly from zero ($H_0: B = 0$; $H_1: B \neq 0$). Here too a t-distribution was employed for the test. In this case, the value of the regression coefficient was significantly different from zero since our calculated

t (1.80332) was greater than the critical t (1.746) at the 95 percent confidence level, using a right tail test.⁸⁰ In other words, the test led to the rejection of the hypothesis that a linear relationship between log Tax Rate and log Income did not exist.

Since the data are in logarithmic form, the equation shows that the estimated responsiveness of the tax rate to a 1 percent increase in median income is positive but far below proportionate.

Impact of School Property Tax

One of the stated objectives of this investigation was to estimate the impact of the school property tax on residential properties in South Dakota. Recalling an earlier discussion, an indirect measure of the impact of the school property taxes between individuals was obtained by expressing their property taxes as the product of several variables and then relating these variables in turn to income. These variables were identified as the assessed value of housing and the tax rate. Therefore, the problem was to measure (1) the relation between the assessed valuation of a home owned by a family and their income and (2) the relation between the property tax rate applicable to this property and the family's income. Furthermore, it was shown that to calculate the percentage difference in total tax payments between individuals it was only necessary to compute the percentage differences in the assessed value of their homes plus the percentage

⁸⁰Yamane, loc. cit.

differences in the tax rates each pays plus the product of these percentage differences. If the resulting figure was greater (less) than the percentage differences in their incomes, the property tax was progressive (regressive) in its impact.

The indirect method may be extended to estimate the impact of the school property tax on residential property within the selected school districts in South Dakota. Essentially the basic logic for this estimation is the same as that utilized in estimating the impact of the tax between individuals. Since property tax payments are a function of housing value and the tax rate, what is needed for this estimation is a calculation of the effects of a given percentage change in median household income on (1) median value of housing and (2) tax rates for school districts in the state. Further, by using log-linear regressions for estimating these two effects, the responsiveness of tax payments to increases in income can be estimated by summing the two regression coefficients with the product of the two coefficients. The results of this procedure provides an estimation of the responsiveness of property tax payments to increases in income over the range of income values included in the regression model.

Having presented the results of the log-linear regressions of median values of housing and tax rates on median household incomes for the sample of school districts it is possible to estimate the impact of the school property tax in South Dakota. For convenience the two equations are reprinted below:

$$(1) \log \text{Housing} = +.68792 \log \text{Income} + \text{constant}$$

$$(2) \log \text{Tax Rate} = +.11177 \log \text{Income} + \text{constant}$$

Stemming from the above discussion, the estimated percentage increases in tax payments resulting from a 1 percent increase in income is given by the sum of the coefficients of income, .80969 percent, plus the product of these two coefficients, .07689 percent. Since the resulting figure, .88658 percent, is less than one, the implication is that a one percent increase in income is associated with a less-than-proportional increase in tax payments, meaning the school property tax on residential properties is regressive in its impact. This further implies that the portion of income paid in school property taxes is unequal at different income levels within the income range employed in this study (3,670 to \$10,650). Specifically this suggests that those households at the lower end of the income range generally pay a higher proportion of their income in school taxes than people at the higher end of the range.

One point of caution should be recognized with regard to the preciseness of the calculated estimates of the impact of the school property tax. The estimation of the relationship between housing and income were computed under the assumption that the ratio of assessed value to market value is constant for all types of properties within a school district. That assumption was needed in order to justify the substitution of market value estimates (Census estimates of market housing value) for assessed value. However, to the extent that there are variations in assessed-to-market ratios within a school district, and if, in turn, these variations are correlated with income, the regression estimates

between these variables will be biased. Possible sources of such bias are:

(1) Underassessment of residential property owned by the wealthy. Many experts on assessment practices believe that the residential properties of the wealthy are underassessed relative to those owned by lower and middle-income groups. Since the wealthy are more likely to live in a one-of-a-kind structure, which are more difficult to appraise, experts argue that the assessor of such property is likely to assign these homes lower values. This means that the Census housing values may be too high for the homes of wealthy people. To the extent that this is true for the school districts included in this study, it would likely lead to a higher than actual estimate of the regression coefficient relation of housing to income, and hence bias the estimated impact of the school property tax toward progressivity.

(2) Underassessment of older residential structures. Stemming from infrequencies of general reassessments of residential properties, older properties may be overassessed or underassessed depending on whether their market value has increased or decreased since the most recent reassessment. Many experts believe that, on the balance, the majority of older residences are underassessed. Hence by substituting Census estimates of true market values of residences for assessed values, again, may be biasing upward the estimates of the "true" assessed valuation of such residences. For reasons similar to above the result may be to bias the estimated impact of the school property tax towards progressivity.

EXTENSION OF STUDY

The results of the regression analysis utilized in this investigation indicate that the impact of the school property tax on residential properties in South Dakota is regressive over the income ranges \$3,666 to \$10,645. This finding suggested that those households at the lower end of this income range typically paid a higher proportion of their incomes in school property taxes than did those households in the upper range.

Rather good evidence compiled in another South Dakota study suggests that the property tax on residential properties is even more regressive at income levels below those included in the present study. One such study was that conducted by the Business Research Bureau of the University of South Dakota under the leadership of Calvin A. Kent in the summer of 1971.⁸¹ The study was partly concerned with the impact of the property tax on the households of the aged. Based on the findings of a survey, Kent concluded that the property tax was very regressive on lower income aged families. In his words: "There are only a few exceptions to the observation that the lower an aged family's income, the greater that family's tax burden."⁸²

To the knowledge of this author no in depth studies have been conducted in South Dakota on the impact of the property tax above the income range used in the present study. Numerous studies in midwestern states,

⁸¹Kent and Lockner, op. cit.

⁸²Ibid., p. 14.

however, have found that the tax on residential property is highly regressive in the income range above \$10,000.⁸³ If the tax impact in the upper income range for South Dakota is similar to that of other states, as is likely, the tax also is highly regressive above \$10,000 in this state.

Given the foregoing discussion, it seems likely that the impact of the property tax is regressive over the entire income scale in South Dakota. Typically other studies have also found that the tax is most regressive at the two extremes and moderately regressive in the middle range. This implies, again, that the property tax payments in South Dakota are not fully responsive to increases in income and that the impact of the tax is contrary to accepted versions of the ability to pay principle of taxation.

SUMMARY

The results of this investigation indicate that the school property tax has a regressive impact over the income ranges \$3,666 to \$10,645 in South Dakota. This means that those households with incomes at the lower end of the scale are typically carrying a higher property tax burden than those households with incomes towards the upper end.

Additionally, this study has provided evidence as to why the school property tax is regressive. Essentially, two factors are

⁸³For a discussion of these studies see Dick Netzer, op. cit. beginning on page 46.

important. First, housing value is relatively unresponsive to increases in income which suggests that higher income households spend a less than proportionate amount of their incomes on residential property. Second, the school tax rate is also highly income inelastic. Since total tax payments are based on the responsiveness of these two factors, both lead to higher income households in South Dakota paying a smaller proportion of their income in property taxes than their lower income counterparts.

The first part of the paper discusses the methodology employed. The second part presents the results of a multiple regression model, the basic research tool utilized for identifying the important factors determining expenditures among the sample school districts. The third part analyzes the results of the multiple regression model.

INTRODUCTION

This investigation is focused on determining the current expenditure per student in selected school districts in South Dakota. The purpose of this study is to identify the factors which influence the expenditure per student in the various districts. The study is based on data from the 1980-81 school year. The data was obtained from the South Dakota Department of Education. The study is limited to the 100 largest school districts in the state. The study is based on the following hypotheses:

Model

The model used in this study is a multiple regression model. The purpose of the model is to identify the important factors which influence the expenditure per student. The model is based on the following equation:

CHAPTER 5

AN ANALYSIS OF FINANCIAL DISPARITIES AMONG SCHOOL DISTRICTS IN SOUTH DAKOTA

This chapter presents the results of the investigation into financial disparities among school districts in South Dakota for the 1971-72 school year. The chapter is divided into three parts. The first part discusses the methodology employed. The second part presents the results of a multiple regression model, the basic research tool utilized for identifying the important factors determining expenditures among the sample school districts. The last part analyzes the results of the multiple regression model.

METHODOLOGY

This investigation focuses on variations in current expenditure per student to evaluate financial disparities amongst school districts in South Dakota. The sample utilized for this purpose consists of the same 18 school districts employed in the previous chapter for the analysis of the impact of the school property tax.

Model

A multiple linear regression model was used to identify the important factors leading to variations in the amount of current per student expenditures among the 18 South Dakota school districts. The

general form of this model was:

$$Y_c = a + b_1x_1 + b_2x_2 + \dots + b_kx_k + e$$

where Y_c represents the value of the dependent variable and x_1, x_2, \dots, x_k are the independent variables. The value of a represents the least squares estimate of the value of Y_c when all of the independent variables are equal to zero; b_1, b_2, \dots, b_k are the least squares estimates of the regression coefficients. These coefficients measure the average change in Y_c given a per unit change in each coefficient's corresponding independent variable with all the other independent variables held constant. For example, b_1 measures the average change in Y_c due to a per unit change in x_1 while holding the other independent variables constant. Finally e represents the error or residual ($Y - Y_c$).⁸⁴

The application of the multiple linear regression model involved a stepwise regression procedure. This procedure enters the independent variables into the regression equation in the order of their importance. The importance of a variable is determined by the reduction of the sum of squares each contributes. Accordingly, the first independent variable is chosen because it has the highest correlation coefficient with the dependent variable. Thereafter the remaining variables are chosen in turn according to the value of their partial correlation coefficient with the dependent variable, that variable having the highest partial correlation coefficient being chosen first. This continues until all

⁸⁴Yamane, op. cit., p. 761.

of the independent variables have been entered into the regression equation. The procedure continually reevaluates previous selections to see if the order stays the same as new independent variables are entered into the equation.⁸⁵

Model Assumptions

Application of the multiple linear regression model requires assumptions that must be identified. Essentially there are three such assumptions. First, it is assumed that the relationship between the dependent and the independent variables is linear. Second, it is assumed that there is no intercorrelation either between the independent variables and/or the error term. Third, it is assumed that the error term is a normally distributed stochastic variable with a mean value of zero, and a constant variance.⁸⁶

Dependent Variable

Current expenditure per student was chosen as the dependent variable in the model. This stems from this measure's being the basic standard of a school district's support of education. The measure was calculated for individual school districts by using data obtained from the 1971-72 Educational Statistics Digest, a publication of the South

⁸⁵N. R. Draper and H. Smith, Applied Regression Analysis (New York: John Wiley & Sons, Inc., 1966), pp. 171-172.

⁸⁶J. Walter Elliot, Economic Analysis for Management Decisions (Homewood: Richard D. Irwin, Inc., 1973), p. 31-32.

Dakota Department of Public Instruction.⁸⁷ Computation of the variable involved dividing total general fund expenditures and special education expenditures for each school district by the total number of students enrolled in their respective schools.

Independent Variables

Several factors were hypothesized to be important in explaining variations in the amounts of current expenditure per student school districts were able to finance during the school year. These factors are:

1. Assessed value per student (x_1). This factor reflects variations in the size of the property tax base that each school district has available for local property taxation. Therefore, the variable was assumed to represent differences among school districts in their ability to pay for education since the primary source of local education revenue is the property tax. The variable was computed by dividing the total assessed valuation (adjusted to equalized values)⁸⁸ of all taxable properties within each district by the total number of students enrolled in the district's schools.

⁸⁷ Department of Public Instruction, op. cit., pp. 13-19.

⁸⁸ Because of the practice in many school districts of assessing their properties at less than the 60 percent of "full and true value" stipulated in state law, it was necessary to adjust their total assessments to this level. The adjusted figures reflect the school district's "true" ability to pay. A similar procedure was necessary for computing the "basic" school tax rate, the resulting value showing the "true" tax effort of school districts. The equalization figures were obtained from the State Department of Revenue.

2. "Basic" school tax rate (x_2). This variable was used to measure the effort of the local levels of government to raise revenue in support of education within each school district. The variable was assumed to exhibit the effect of differences in effort in elucidating variations in current expenditures. This variable was calculated by dividing the total school tax revenue generated in each school district by the total assessed valuation of all properties (adjusted to equalized value) within their boundaries.

3. Availability of state and federal aid (x_3). The availability of state and federal funds to supplement locally raised revenues was assumed to influence the level of educational expenditures each school district financed. Hence this variable was used to represent differences in the amounts of these funds received by school districts in explaining variations in their per student expenditures. The variable was calculated as the ratio of the total expenditures financed by each district to locally generated revenue.

4. Amount of noncurrent expenditures (x_4). Noncurrent expenditures was used to measure the amount of total expenditures being devoted to capital outlays and bond redemption and not being used for operating costs related to current expenditures. The variable was assumed to demonstrate the effects that differences in noncurrent expenditure among school districts may have had in explaining variations in current expenditure per student. This variable was measured as the ratio of current expenditures to total expenditures and largely represented varying amounts of construction being undertaken by each of the 18 school districts.

5. Median household income (x_5). Median household income was used as a rough proxy to demonstrate the willingness of taxpayers to pay for education among the different school districts. The variable was thus assumed to show the possible effects of school district's willingness to pay for education in accounting for variations in current expenditures. The calculation procedure for this factor was explained in the previous chapter and need not be repeated here since the same figures are used.

Having identified the dependent and independent variables, the investigation required the solution of the following multiple linear regression equation:

$$Y_c = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5$$

where: Y_c = estimated value of current expenditure per student

a = Intercept of regression plane

b_1 = least squares regression coefficient estimate of x_1

x_1 = Assessed value per student

b_2 = least squares regression coefficient estimate for x_2

x_2 = "Basic" school tax rate

b_3 = least squares regression coefficient estimate for x_3

x_3 = Federal and State aid

b_4 = least squares regression coefficient estimate for x_4

x_4 = Noncurrent expenditures

b_5 = least squares regression coefficient estimate for x_5

x_5 = Median household income.

This multiple regression equation is considered to be deterministic, in that, examination of the relationships between current expenditure per student and the independent variables allows for inferences to be made regarding the amount of variations in the former explainable by variations in the latter. Of course, it should be recognized, that the degree of association between these variables does not prove that the independent variables caused variations in current expenditure per student. However, it can be expected that the degree of association does provide insights into the relationship between these variables.⁸⁹

STATISTICAL RESULTS

Equation

The identified multiple linear regression equation was estimated using the school district data shown in Table V-1. The resulting equation is:

$$Y_c = -218.83121 + 111.34647x_3 + 0.00835x_1 + 262.09302x_2 \\ + 225.37303x_4 - 0.01565x_5 \\ \bar{R}^2 = 0.7482$$

As explained earlier, the stepwise regression procedure entered the independent variables into the regression equation in the order of their importance. On the basis of this process, the availability of state and federal aid (x_3) was selected as the most important factor in explaining

⁸⁹This was recognized in another study concerned with variations in per capita costs among county governments in South Dakota. See: Richard P. Johnson, "An Analysis of the Factors Influencing the Variations in the Per Capita Cost of South Dakota County Governments" (unpublished Master's thesis, South Dakota State University, 1973), p. 97.

TABLE V-I

PRIMARY DATA OF INDEPENDENT VARIABLES

School District	Current Exp/Stud	Assessed Val/Stud	"Basic" School Tax Rate	Total Exp/ Local Revenue	Current Exp/ Total Exp	Median Income
Huron	677.24	28865.46	1.658	1.54	0.92	9333.80
Sioux Valley	687.19	37950.93	1.383	1.48	0.88	7054.74
Vermillion	770.93	41078.68	1.422	2.32	0.57	7947.10
Watertown	653.94	30274.98	1.702	1.42	0.89	10644.42
Mitchell	819.50	33704.65	1.724	1.64	0.86	8180.70
Waubay	752.79	27274.58	1.313	2.26	0.93	5516.60
Astoria	845.56	46922.84	1.185	1.62	0.94	3666.60
Milbank	706.93	37229.74	1.324	1.69	0.85	8250.88
Hyde	788.50	69017.53	0.800	1.56	0.91	6392.80
Lake Preston	859.20	55633.28	1.272	1.27	0.96	6563.95
Chester	727.39	43194.29	1.169	1.66	0.86	9269.20
Harrisburg	681.43	37673.32	1.396	1.84	0.70	8950.00
Meade	640.07	42151.89	1.072	1.52	0.90	8118.10
Sioux Falls	663.59	29611.82	1.652	1.53	0.88	9616.70
Baltic	726.59	40210.76	1.123	1.66	0.97	9571.40
Jefferson	617.63	42951.70	1.516	1.03	0.93	7981.01
Gayville-Volin	912.43	59820.94	1.211	1.34	0.93	6731.25
Todd Co.	1022.59	16472.82	1.021	6.47	0.94	4688.77

Source: Department of Public Instruction, Educational Statistics Digest (Pierre: State Publishing Co., 1971-72), pp. 13-19.

variations in current expenditures per student. The independent variables in the order of their importance were:

1. State and federal aid (x_3)
2. Assessed value per student (x_1)
3. Basic school tax rate (x_2)
4. Noncurrent expenditures (x_4)
5. Median household income (x_5)

Because of the inclusion of the Todd County Independent School District in the estimation, however, the importance of the availability of state and federal aid in explaining variations in current expenditure per student seemed to be overstated. This stems from the district being on an Indian reservation which meant it received considerably more revenue from the state and federal governments than many of the other school districts in the state. To test for this possibility, the multiple regression equation was recomputed excluding the Todd County district from the sample. The estimated equation was:

$$Y_c = -1229.87988 + 0.01177x_1 - 0.00378x_5 + 371.33423x_2 \\ + 293.17212x_3 + 607.47119x_4$$

$$R^2 = 0.7191$$

Again, since a stepwise regression procedure was utilized, the independent variables were entered into the regression equation in the order of their importance in explaining variations in current expenditure per student. On the basis of this selection, the independent variables were

entered in the following order:

1. Assessed value per student (x_1)
2. Median household income (x_5)
3. School tax rate (x_2)
4. Availability of State and Federal aid (x_3)
5. Noncurrent expenditure (x_4)

Comparison of the results of the two estimations implies support for the hypothesized suggestion that Todd County Independent School District may have overstated the importance of the availability of state and federal aid in explaining variations in current expenditures per student. Whereas in the original estimation state and federal aid had been chosen as the most important of the independent variables, the recomputed estimation deleting this school district found the variable to be the fourth most important. Based on this result, and the further recognition that Todd County Independent School District is atypical insofar as school finance in the state is concerned, it was decided that the recomputed regression equation was more applicable as a general basis for evaluating variations in school finance in South Dakota.

Test for Multicollinearity and Autocorrelation

Before proceeding into the analysis, it is necessary to determine if the computed regression equation violates any of the assumptions underlying the application of the multiple linear regression model. Recalling earlier discussion, one of the assumptions for the application of this model is that no intercorrelation exists between the independent

variables. The presence of such dependence, multicollinearity, causes the standard error of the regression coefficients to become large and thus reduces the preciseness of the regression coefficients. This, in turn, lessens the ability to support conclusions as to the significance of the independent variables.⁹⁰

The simplest indicator as to whether or not intercorrelation exists between the independent variables is to analyze the simple correlation coefficients, each of which "measures the associated movement in two variables when the effects of the other variables are held constant."⁹¹ As a general rule, multicollinearity is tolerable if the multiple correlation coefficient is greater than the simple correlation coefficients among the independent variables.⁹² As shown in Table V-II, some degree of association exists between the independent variables but this is not considered to be overly significant since in all cases the degree of association between these variables is less than the multiple correlation coefficient.

Subsequent to the need to test for multicollinearity is a need to test for possible intercorrelation within the error term. The presence of such correlation is defined as autocorrelation and if present this phenomenon causes the calculated error measures to be unreliable.

⁹⁰Elliot, op. cit., pp. 59-62.

⁹¹Elliot, op. cit., p. 62.

⁹²L. R. Klein, Introduction to Econometrics (Englewood Cliffs: Princeton-Hall, 1962), p. 101.

TABLE V-II

CORRELATION MATRIX FOR INDEPENDENT VARIABLES¹

<u>Assessed Value Per Student</u>	<u>Basic School Tax Rate</u>	<u>State and Federal Aid</u>	<u>Non- Current Expend- itures</u>	<u>Median House- hold Income</u>	
1.00000	-0.73936	-0.32315	0.16028	-0.48583	Assessed Value per Student
	1.00000	-0.05682	-0.19328	0.57913	"Basic" School Tax Rate
		1.00000	-0.60848	-0.19238	State and Federal Aid
			1.00000	-0.18037	Noncurrent Expenditures
				1.00000	Median Household Income

¹Each row and column of the matrix shows the correlation coefficients between an independent variable and each of the other independent variables. For example, the first row contains the correlation coefficients between assessed value per student and each of the other independent variables. Similar interpretations are true for the other rows.

(3.05) The Durbin-Watson statistic has been developed to test for the occurrence of such autocorrelation. The application of this test to the estimated regression equation found the calculated Durbin-Watson statistic for the error term in the model to fall in the inconclusive region at the 95 percent level of confidence.⁹³ This means that it is not possible to conclude that autocorrelation either did or did not exist within the error term.

Tests of Significance

Two tests of significance are also important in determining the precision of the estimated regression equation. First, it is necessary to test whether or not the overall regression (R^2) is significantly different from zero and second to determine whether or not the net regression coefficients (b_1, b_2, \dots, b_5) for each of the independent variables are significant.

To determine whether the overall regression was significant an F distribution is used to test the hypothesis:

$$H_0: b_1 = b_2 = \dots b_5 = 0$$

On the basis of this test, the overall regression (R^2) is found to be significantly different from zero at the 95 percent confidence level since the calculated F-Value (8.228) is greater than the critical F-Value

⁹³Ibid., pp. 355-357.

(3.09).⁹⁴ Thus it is reasonable to conclude that a linear relationship adequately represents the population and the improvement of estimating Y_c by fitting the regression line over that which could have been achieved by the arithmetic mean was not due to chance alone.

To determine if the net regression coefficients are significantly different from zero, a student - t - distribution is utilized to test the hypothesis:

$$H_0: b_1 = 0; b_2 = 0; b_3 = 0; b_4 = 0; b_5 = 0$$

On the basis of this test, four of the five net regression coefficients were found to be significantly different from zero. These were the regression coefficients associated with the independent variables, assessed value per student (x_1), "basic" school tax rate (x_2), availability of state and federal aid (x_3), and noncurrent expenditures (x_4). For the remaining independent variable, median household income (x_5), the regression coefficient was found to be insignificantly different from zero. There results suggest that while it is highly likely that a linear relationship exists between current expenditure per student and the first four independent variables, it is equally highly likely that such is not the case for the relationship between current expenditure per student and the latter independent variable.⁹⁵

⁹⁴Yamane, op. cit., pp. 880-885.

⁹⁵Draper and Smith op. cit., pp. 72-73.

ANALYSIS OF THE STATISTICAL RESULTS

The independent variables are analyzed in this section. In order to facilitate the discussion, each of the five variables are evaluated separately. The analysis focuses on three main criteria to investigate the importance of each independent variable in explaining variations in current expenditure per student. The criteria are: the importance of the variable as selected by the stepwise regression procedure, the direction of influence as shown by the sign of the regression coefficient, and the significance of each variable's regression coefficient.

Assessed Value per Student (x_1)

Assessed property value per student was assumed to represent the ability of each school district to finance education. The range of assessed value per student varied from a low of \$27,274.54 for the Waubay Independent School District to a high of \$69,017.53 for the Hyde Independent School District. It should be noted, however, that the range is not a good

indication of the variability of these variables, since it accounts for only the extreme values. A better indication is given by the coefficient of dispersion. This coefficient is computed by dividing the standard deviation of each set of data by the mean. The measure has the advantage of showing the relative dispersion of each set of data, thus allowing the comparison of different variables to be compared. The values of this coefficient for each variable were computed and are shown in Table 1. The sign of the regression coefficient for this variable was positive and significant. This indicates that there was a direct linear relationship between assessed value per student and current expenditure per student such that if the former were to increase (decrease) the latter would do likewise.

The results suggest that the amount of current expenditure per student a school district can finance is partially a function of the taxable capacity therein. Also, variations in the amounts of assessed value per student are important in explaining variations in per student expenditures. Of course, these observations are hardly surprising since such a large share of the revenues to finance primary and secondary education in South Dakota comes from the local property tax.

It should be noted, however, that inspite of the importance of variations in this variable to explain variations in a school district's expenditures, considerable evidence suggests that at least part of the influence of assessed value was offset by variations in other independent variables. One indication of this is the difference in the range of variation for current expenditure per student (\$617.63 to \$912.43) which is far less than the range in assessed value per student (\$27,274.58 to \$69,017.53). It should be noted, however, that the range is not a good indication of the variability of these variables, since it accounts for only the extreme values. A better indication is given by the coefficient of dispersion. This coefficient is computed by dividing the standard deviation of each set of data by the mean. The measure has the advantage of showing the relative dispersion of each set of data, thus allowing the dispersion of different variables to be compared.⁹⁶ The values of this

⁹⁶Yamane, op. cit.

school districts, and, hence, worked to lessen the range in current expenditures per student between these districts. These values indicate that the relative variation of assessed value per student was far greater than the relative dispersion of current expenditure per student (approximately 2.4 times as great). The implication is that part of the explanatory ability of assessed value to explain variations of current expenditures was partially offset by variations in other independent variables.

A convenient procedure to determine the validity of the foregoing observation is to analyze the correlation coefficients between assessed value per student and each of the other independent variables. These measures may be interpreted as showing the direction and degree of association between two variables. Referring back to Table V-II, the first row of the correlation matrix shows the correlation coefficients between assessed value and the other independent variables. As can be seen, assessed value per student was found to be negatively correlated with all of the independent variables except noncurrent expenditures (x_4). These statistics indicate that there was an inverse relationship between variations in assessed value and variations in the other variables. This implies that the variations in the other variables tended to counter-

balance the rather wide range of assessed value per student between the different school districts. Hence, to say that a school district is wealthy means that it has a large amount of assessed value per student. On the other hand, a school district is considered poor if it has a relatively small amount of assessed value per student.

school districts,⁹⁷ and, hence, worked to lessen the range in current expenditures per student between these districts.

"Basic" School Tax Rate (x_2)

The school tax rate was assumed in the regression model to represent the local district's effort to raise revenue for the support of primary and secondary education. A higher value for this variable would indicate a greater effort on the part of a school district. The range of this variable was from a high of 1.724 for the Mitchell School District to a low of 0.800 for the Hyde Independent School District.

Within the stepwise regression procedure, this variable was chosen as the third most important independent variable in explaining variations in current expenditure per student (-.73936). This indicates that there was a strong inverse relationship between the school tax rate and assessed property value per student. The regression coefficient for the relationship between these two independent variables. Further, the variable was positive and significant indicating that a direct linear relationship existed between the school tax rate and current expenditure per student. Essentially, this means that the school tax rate has a direct positive effect on current per student expenditures such that as the tax rate increases so typically does current expenditure per student.

The partial correlation coefficient between the "basic" school tax rate and current per student expenditure was negative (-.32264), however,

⁹⁷In this study, the amount of assessed value per student is used as a proxy of the relative wealth of different school districts. Hence, to say that a school district is wealthy means that it has a large amount of assessed value per student. On the other hand, a school district is considered poor if it has a relatively small amount of assessed value per student.

suggesting that oftentimes these two variables varied in opposite directions. This implies that in many cases those school districts which taxed themselves most heavily and hence exerted the greatest effort to locally support education were not among the districts with the greatest spending per student. This observation may seem somewhat surprising since one would expect that a school district would be rewarded for its greater effort by being able to finance greater expenditures.

A look at the simple correlation coefficients between the school tax rate and the other independent variables gives insights as to why this was not the case. Of particular note is the strong negative correlation coefficient between the school tax rate and assessed property value per student ($-.73936$). This indicates that there was a strong inverse relationship between these two independent variables. Further, the statistic suggests that part of the reason why those school districts exerting the greatest local effort were not among those financing the highest expenditures was because the districts were typically rather poor in terms of assessed value per student. Hence, since these poorer districts had a small tax base, they required a larger effort to finance even relatively low per student expenditures. Wealthier districts, on the other hand, because of the large amounts of assessed value per student they had available for taxation, were able to finance high expenditures per student with low tax rates.

State and Federal Aid (x_3)

State and federal aid represented the availability of monies school

districts received to supplement the revenue they raised locally. The variable was in ratio form, with higher values signifying greater aid from the federal and state governments. The range of this variable was from 2.32 for Vermillion to 1.03 for the Jefferson Independent School District.

State and federal aid was selected as the fourth most important variable influencing current expenditure per student. The sign of the regression coefficient was positive and significant indicating that there was a direct linear relationship between the variable and current expenditure per student. This implied that as state and federal aid increased (decreased), current expenditure per student increased (decreased).

A study of the simple correlation coefficients of state and federal aid with other independent variables offers some insights into the role this variable played in influencing variations in current student spending financed by different school districts. State and federal aid had a relatively high negative correlation (-0.32315) with assessed value per student (x_1). This implies that the distribution of this aid was inversely related to the wealth of a district such that as the wealth of a school increased (decreased), the amount of aid received from these sources decreased (increased). The implication is, therefore, that the distribution of state and federal aid may have had an equalizing effect between the wealthier and poorer school districts and typically worked to lessen the wide disparities between the districts local revenue raising capacity.

Noncurrent Expenditures (x_4)

Noncurrent expenditures (x_4) represented differences among school

districts in the amount of funds spent on capital outlays and bond redemption which were not directly related to current expenditures. The variable was in ratio form with lower values indicating more spending going to noncurrent expenditures. The range of this variable was from a low of 0.57 for the Vermillion School District to a high of 0.97 for the Baltic District.

The variable was selected by the stepwise procedure as the fifth most important variable influencing current expenditures. The sign of the regression coefficient was positive and significant implying that there was an inverse relationship between noncurrent and current expenditure per student. This, in turn, indicated that as noncurrent expenditures increased (decreased), current expenditure per student decreased (increased).

The results suggest that school districts that devote more money to noncurrent expenditures typically devote less to current expenditures per student. This implies support for the hypothesis that school districts involved in large amounts of construction may have been redirecting revenues that would otherwise have gone to finance current expenditures.

The simple correlation coefficients between noncurrent expenditures and other independent variables give insights into this variable's influence on variations in current spending. The positive correlation (0.16028) of noncurrent expenditures and assessed value per student suggests that wealthier school districts typically spent less on construction than districts with small assessed property valuation. Along with the inverse relationship between noncurrent and current expenditures, this correlation

statistic implies that this variable may have worked to widen the variations in current expenditure per student between property wealthy and property poor school districts.

Median Household Income (x_5)

Median household income (x_5) was assumed to represent the willingness of the citizens of a school district to pay for education. Higher values of this variable were thus assumed to represent greater willingness to finance education. The range of the values of this variable were from a high of \$9,733.16 for the Baltic Independent School District to a low of \$5,214.00 for the Hyde District.

Median household income was selected as the second most important independent variable influencing variations in current per student spending. The regression coefficient was negative which would indicate that as the median income of a school district increased (decreased) current expenditure per student within the district's schools decreased (increased). The regression coefficient for this variable was insignificant, however, so that any conclusions concerning the direction of influence on current expenditures are tenuous.

The results imply that those school districts with higher median household income typically spent less to finance education. To the degree that the variable measures the willingness of people to finance education, the finding seems surprising since it would be expected that people with higher incomes would be willing to support more educational spending for their children. Once again the simple correlation coefficients of

this variable with other independent variables gives insights as to why this may not have been the case. The correlation coefficient of median household income with assessed value per student (x_1) was highly negative (-0.48583). This implies that those school districts with high median incomes typically had relatively small taxable property within their jurisdictions. Thus, it may not have been that a districts' citizens had no desire to locally finance better education, but rather that small property valuations prevented their being able to finance large educational expenditures.

This possibility is given additional support from the high correlation (0.57913) between median household income and the school tax rate (x_2). This indicates that those districts with the highest median household income oftentimes tax their property at the highest rates. Further, this suggests that the citizens of these school districts put forth the greatest effort to locally support their schools, but as has already been indicated, this effort usually was needed to partially make up for the small amounts of assessed property valuation they have available for taxing purposes.

The implication of these correlations, therefore, is that those school districts with the highest median household income may have wanted better education for their children and were willing to exert a greater effort to provide high quality education, but due to the small amounts of assessed value per student they could tax, oftentimes their efforts were necessary to provide even moderate levels of educational spending.

SUMMARY

Based on the findings of this chapter, considerable evidence indicates that to a large extent the differences in the amounts of current expenditure per student school districts financed were attributable to the wide disparities in the property wealth different districts had available for taxation purposes. Essentially, this conclusion stems from the importance assessed value per student had in explaining variations in current expenditure per student. Furthermore, since the regression coefficient for this variable was positive and highly significant, it seems likely that as assessed valuations widen between school districts, so typically did differences in the amounts of current expenditures each were able to finance.

Another important finding is that the disparities in current per student expenditures were not as wide as the disparities in assessed valuations per student between school districts. This was likely due to variations in the other determinants of current expenditure per student working to offset somewhat the differences in property wealth among the different school districts. One such variable was the school tax rate. Generally, as was seen, the property poor school districts tax their property at higher rates than do those districts with high assessed valuations, hence offsetting in part the advantages that the latter districts had in raising funds for education.

Another important variable which may have worked to offset the advantages enjoyed by wealthier school districts was state and federal

aid. As was seen, the distribution of such aid was inversely related to the property wealth of a school district, implying that the aid tended to equalize the expenditure potential of the several districts. Despite the offsetting nature of variations in state and federal aid and tax rates, however, in general wealthy school districts were still able to finance much larger per student spending as compared to poor school districts.

CHAPTER VI

SUMMARY, POLICY IMPLICATIONS, AND SUGGESTIONS

FOR FURTHER RESEARCH

This study was concerned with obtaining information on the impact of the school property tax and the financial disparities among independent school districts in South Dakota. The study was undertaken based on the recognition of the need for more quantitative information both on the impact of the school property tax and to gain insights into the financial disparities in expenditure patterns of school districts in the state.

IMPACT OF SCHOOL PROPERTY TAX

In Chapter IV a statistical analysis was employed to ascertain the impact of the school property tax on residential property. The analysis utilized an indirect approach wherein it was necessary to estimate the effects of a given change in median income on (1) median value of housing and (2) the tax rate. Log-linear regressions of median housing value and the tax rate on median income were used for the purpose. The resulting estimation provided an indication of the responsiveness of property tax payments to increases in income over the range of the income values included in the regression models (\$3,670 to \$10,600).

Results

The investigation suggested support for the hypothesis that the

impact of the school property tax on residential properties is regressive over the income range included in the study. The estimated responsiveness of tax payments to a one percent increase in income was .88658 percent. This statistic implied that an increase in income was associated with a less-than-proportional increase in tax payments. This further suggested that the proportion of income paid in school property taxes was unequal at different income levels within the range investigated with those households at the lower end of the income range paying a higher proportion of their incomes in taxes than those at the upper end.

In addition, to the estimation of the impact of the school property tax, this part of the investigation also provided indications as to why the tax had a regressive impact. First, the value of housing was relatively unresponsive to increases in income and second the school tax rate was highly unresponsive to increases in income. Since the residential tax payments are a function of these two variables, housing value and tax rate, the finding that these two variables were relatively unresponsive to increases in income suggests that the aggregate of these income inelastic relationships were accountable for the total tax payments typically rising less than proportionately with income.

Policy Implications

The finding that the school property tax on residential properties is regressive has implications for South Dakota's policy makers. This stems from the recognition that the tax places unusually high burdens on the lower income families in the state. In this respect,

therefore, the tax as presently administered is contrary to a widely accepted version of the "ability to pay" principle of taxation. This version calls for the proportion paid in tax payments to increase with increases in income. As has been noted, however, the opposite relationship is now typically the case with the school property tax in South Dakota.

Several reforms have been suggested as possible alternatives to correct the present inequalities in the impact of the property tax. For the most part, the majority of the proposals call for the state legislature to assume the responsibility for the implementation and supervision of reform.

One of the more fundamental proposals calls for the complete repeal of the property tax over several years. The tax would be replaced by one administered by the state (i.e. state personal income tax and/or a business profits tax), the revenue of which would be redistributed to local governmental units now dependent upon the local property tax for their revenues. Although such reform may provide a solution to many of the current inequities in the property tax, it is questionable whether such legislation would pass the state legislature. Within recent years, similar legislation has met considerable opposition in the South Dakota legislature and no substantial change is foreseeable. Thus, despite the potentially desirable qualities of such changes from an equity standpoint, the likelihood of such reform being implemented appears slim at the present time.

In light of these considerations, it seems probable that less radical reform alternatives are likely to receive more favorable support in the state legislature. One possible alternative, therefore, is the use of a property tax circuit breaker which would provide relief to those individuals at the lower income levels who presently pay such a large proportion of their incomes in property taxes. The amount of relief granted would vary with the characteristics of the legislation enacted. The essential idea behind the circuit breaker is that the proportion of an individual's income paid in property taxes should not be excessive. Thus, when the total tax payment of an individual goes beyond a certain percentage of his income he is eligible for relief. It should be noted, that this type of reform does not provide a solution to the overall inequities of the school property tax. Rather, it would work to lessen the excessive burden the tax presently has on some families, particularly those with low incomes.

FINANCIAL DISPARITIES AMONG SCHOOL

DISTRICTS IN SOUTH DAKOTA

In Chapter V a multiple linear regression analysis was employed to determine the primary factors accountable for the financial disparities among independent school districts in South Dakota during the 1971-72 school year. The investigation focused on the variations in current expenditure per student since this variable represented the basic measure of a school district's financial support for education. Accordingly, current expenditure per student was chosen as the dependent

variable in the regression model. It was hypothesized that variations in this variable among school districts in the state were influenced by five independent variables: assessed value per student, basic school tax rate, availability of state and federal aid, noncurrent expenditures and median household income.

The regression equation was estimated by a stepwise regression procedure. The results, in turn, were analyzed to determine the importance and direction of influence variations in each of the independent variables had in explaining differences in current expenditure per student among school districts in the state.

Results

With emphasis on the significance of the independent variables as the main criteria, the results indicated that the primary determinants in explaining variations in current expenditure per student were variations in: assessed value per student, basic school tax rate, availability of state and federal aid, and non-current expenditures. The other independent variable—median household income—lacked statistical significance and hence was considered less important.

The investigation also provided insights into the role played by each of the significant independent variables in influencing variations in expenditures. Considerable evidence indicated, for instance, that to a large extent the differences in the amounts of current expenditure per student that school districts were able to finance was due to the wide disparities in assessed value per student available in different school

districts. Furthermore, stemming from the positive regression coefficient of this variable it was suggested that as disparities in property wealth widen, so typically do differences in the amounts of current expenditure per student.

Additionally, the evidence suggested that differences in current expenditure per student may have been even more pronounced had it not been for variations in other independent variables working to partially offset the disparities in property wealth among the state's school districts. Essentially two independent variables, basic school tax rate and federal and state aid were instrumental in this respect. The basic school tax rate was found to vary inversely with assessed value per student indicating the property poor school districts that typically tax their properties at higher rates than do property wealthy school districts. By doing so, these districts probably partially offset the advantage the wealthy school districts had in raising revenue for their schools. Of course this also meant that some of the districts that exerted the greatest local effort to raise revenue for their schools didn't get rewarded with higher expenditures.

The distribution of state and federal aid was also seen to vary inversely with school district property wealth, indicating that such aid may have had some equalizing effect between property poor and property wealthy school districts. Typically, as was seen, this aid was distributed in a manner such that it was more available to poor districts than

to wealthy districts hence working to counterbalance somewhat the fiscal capacity of the wealthy district.

Despite the offsetting nature of variations in the determinants of current expenditures, the amounts of expenditures per student financed by property wealthy school districts was still considerably greater than that financed by property poor school districts in the state. In other words, the local property tax base largely determined how much expenditure each school district could finance and at what tax effort.

Policy Implications

The results imply that some type of changes are necessary in the current system of school finance in South Dakota. This is especially true since at present the quality of a child's education is determined more by the property wealth of the school district in which he lives than according to his needs and aspirations as was implied in the wording of the South Dakota State Constitution.

One way to lessen the heavy reliance of school districts' educational expenditures on their property wealth would be to make the financing of education a state function. Accordingly, the state government would be responsible for raising all the revenue needed to finance education in the state. The revenue collected would, in turn, be redistributed to the local school districts in the state who would retain their powers over the budgeting of the revenue received according to their particular circumstances. This possibility was indirectly considered in

the first part of the chapter but further observations are in order at this point.

Although such reform may have desirable features of eliminating the current influence of property wealth on educational expenditure, it also raises questions as to its workability and real effects on the present inequities in school finance in the state. One question that comes to mind is: how will the needed revenues be raised? At present, it would seem most likely that a state property tax would have to be used, since considerable monies would have to be raised and any other tax(es) capable of providing such revenues would not likely be enacted in the state legislature. A state property tax would allow tax rates to be equalized throughout the state. This, in turn, would suggest that the tax rates of the property poor school districts in the state would typically decrease while the tax rates in property wealthy school districts would probably increase.

Although this may seem desirable, in reality, the effects of the rate changes would probably add to the already existing regressive impact of the school property tax. Essentially this stems from the property wealthy school districts in the state typically being in rural areas encompassing mostly farms and ranches, the owners of which generally have incomes lower than city dwellers. Thus raising the tax rates applicable to their properties will require them to pay more in taxes out of their traditionally small incomes and hence add to the already regressive impact of the property tax.

These observations suggest, therefore, that the adoption of a state property tax system for raising revenue for education in South Dakota would necessitate considerable tradeoffs at the present time. The system would probably produce desirable effects in curbing some of the current inequities in the present expenditure pattern in school finance but would likely aggravate the already existing inequities in property tax impact.

Another possible approach to eliminating the influence of school district wealth on educational expenditures would be for the state legislature to attempt to equalize the fiscal capacity of all districts. By doing so, any differences in expenditures between school districts would be attributable to differences in their local tax efforts rather than disparities in their tax base.

One method that would accomplish such equalization would be to reorganize school districts in the state in a manner that would make the assessed value per student of each approximately the same. Although this reform would have considerable promise in helping to make the state's educational system more equitable, past experience with school district reorganization and consolidation in South Dakota makes the political feasibility of such reorganization questionable. This becomes even more so when it is recognized that due to the wide diversity of property wealth in the state it is highly probable that the only way to equalize the tax capacity of all school districts would be to make some of them very large in geographical area.

A final approach to greater equity in the present system of school

finance in South Dakota would be to expand the basic state aid programs currently in operation. The advantage of this approach is that it would not require any fundamental institutional change and, hence, would probably receive the least political resistance. Of course such an expansion in aid would require additional state revenue going to education but this approach would seem more realistic than asking the state legislature to take the broad sweeping steps necessary for the implementation of the other more drastic reform measures.

Along with the need for expanded state aid to education, is the need for greater equalization in the present system of aid to education. Essentially this would involve the distribution of state aid to be more on the basis of a school district's particular characteristics (e.g., local fiscal capacity) rather than in flat grants to each district on a classroom unit basis. Aid distributed in this manner would likely be more effective in equalizing educational quality in the state since the criteria for the distribution of aid under this method would differentiate between the needs of different school districts to a greater extent than flat grants typically do.

It is the recommendation of this author that given the present state of affairs in South Dakota it would be best for the state's policymakers to pursue the option of expanding basic state aid programs in an attempt to achieve greater equality in education within the state. This recommendation is based on the approach probably having the greatest potential of being enacted by the state legislature and, further, on the

favorable effects it will have on the present short-comings of the existing system of school finance in the state.

SUGGESTIONS FOR FURTHER RESEARCH

Although the present study provides insights into the impact of the property tax and the reasons for the financial disparities in the present system of school finance, the need for further research in both of these areas is readily apparent.

In the area of taxation, since the impact of the property tax has been pretty well documented as being regressive, both in this and other studies, the next logical step would be for research to be undertaken to correct the present shortcomings of the tax. At present, it would seem most likely that this would necessitate the eventual repeal of the property tax entirely, therefore research directed towards finding a suitable substitute--both in revenue raising capacity and political feasibility--would be most beneficial.

In the area of school finance, many facets are still in need of research. Since the approach recommended in this study to alleviate the current inequities in school finance necessitates relatively accurate information on the different school districts' characteristics (i.e., fiscal capacity and cost differences) studies designed to provide such information are crucial. Also, given the shortcomings of current expenditure per student as a proxy of educational quality, research directed at obtaining a more suitable measure of the relationship between quantity and quality of educational output would also be useful.

Finally, since the school finance part of this study utilized cross sectional data (1971-72 school year data) the applicability of the findings of this investigation as a basis for policy decision will likely decrease with the passage of time. This is because the school finance relationships found to exist in 1971-72 are likely to change somewhat in future years. This suggests, therefore, that the analysis employed in this study need be repeated periodically so as to provide the state's policymakers with the most up-to-date information upon which to base their decisions.

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